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CHRONIC RECURRENT SUPPURATIVE OTITIS MEDIA AND ITS RELATION TO MASTOID AND INTRACRANIAL COMPLICATIONS.[1]

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Intermittent Otitic Discharge More Dangerous than the Constant Variety.—In considering the subject of chronic recurrent suppurative otitis media, I will endeavor to demonstrate that this particular form of aural disease is relatively productive of more complications, intracranial and otherwise, than the continuous variety. I have been particularly impressed with the importance of this subject from the fact that the belief still persists, both among the profession and the laity, that an aural discharge which is intermittent is of little importance, the assumption being, therefore, that the underlying disease is never dangerous to life. This fact clearly illustrates that the pathology and prognosis of these conditions are not generally understood, notwithstanding the marked progress which otology has made in this direction during the past decade.

Our Duty to the Profession and to the Laity.—For years past many of us have been persistent and untiring in our efforts to impress upon the profession the importance of aural disease, and to indicate the obligation due our patients in the prompt recognition and treatment of the same. Like all weighty medical problems, the evolution has been slow, but we have at least established a fairly good general conception of the acute diseases, their dangerous complications and ofttimes tragic sequelæ. As the general surgeon has persistently urged, year after year, the necessity of early operative interference in appendicitis, so must we labor to secure a proper realization of the actual dangers of a discharging ear. Furthermore, we must not only recognize this condition, but must properly appreciate its gravity and demand the adoption of prompt and efficient measures for its relief.

This wide-spread indifference to a very grave problem is the natural outcome of continued apathy on the part of the medical profession, and if the Fellows of this society are to conserve her honorable traditions, it becomes the immediate and imperative duty of each and every one of us to spare no effort, however self-sacrificing, to place before the profession some plain facts relative to the ever-present dangers of an otorrhea. We must, therefore, accept the obligations and responsibility created by such circumstances, and resolve to diffuse, in the most effectual manner at our command, such information as will throw proper and responsive light on this subject before the great body of practicing physicians, who will in turn be moved to action and will thereby become the legitimate instructors of their patients, the laity.

Value of Prophylaxis.—In this connection I wish again to take the opportunity of pointing out the great value of prophylaxis as applied to mastoid and intracranial involvement, complicating acute tympanic dis-

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ease. In the primary stage we find a simple hyperemia and swelling of the mucosa, together with some sero-mucous exudate. At this particular period probably four-fifths of all cases will yield promptly if the well-known simple measures for their relief are immediately applied, whereas the vast majority of all serious complications are directly traceable to the unpleasant fact that these primary measures have been partially or wholly neglected.

I am not unmindful of certain cases complicating the exanthemata, influenza, etc., which seem to be virulent and purulent from their very inception, but even in such cases a free incision of the membrana tympani before bulging occurs will usually prevent serious involvement of the accessory cavities and adjacent structures. Such clearly defined facts should, therefore, convince us that a discharging ear, whether of the acute or chronic form, is frequently the result of woful ignorance or indifference, and that the subsequent mastoid and intracranial implications are mainly chargeable to the same cause.

At times we are confronted with the statement that an otorrhea has existed for many years without producing untoward symptoms. So long, therefore, as the patient experiences no actual suffering he is content, often by the advice of his physician, "to let well enough alone." This view-point is quite natural and excusable on the part of the patient, but it does seem inconceivable, in this day of progressive and preventive medicine, that those charged with and professing to conserve the public health should so far forget their obligations or misinterpret their humane duty.

As a body, those practicing the learned profession of medicine are among the most honorable, and certainly the most self-sacrificing, men to be found in any calling; consequently, this lackadaisical attitude toward aural disease that we too often meet with can only be attributed to misconception or misinformation as to the worth and importance of the subject. Such being the case I again wish to proclaim to this society, individually and collectively, the dissemination of such information or instruction as may be necessary for the betterment of our profession. This, when viewed in the light of civic duty, must be accepted as an imperative obligation due to our fellow men.

Illustrative Cases.—In order to properly illustrate the destruction that frequently accompanies a recurrent suppurative otitis media, I will briefly relate the histories of three typical cases, which I have recently operated upon.

Case 1.—History: T. W. D., male, aged forty-four years. There is some doubt as to whether he suffered from aural disease early in life. During the past three years he has had a recurrent suppurative otitis media of the left ear, the primary cause of which is unknown.

The patient came under my care at the Jefferson Medical College Hospital, April 3, 1908, stating that for the past three or four days he had suffered very severe pain, not only in the ear and over the mastoid process, but also on that entire side of the head, so much so that hypodermic injections of morphine were necessary to relieve his suffering. The history furthermore states that these acute exacerbations occurred about every three or four months. In the interim the ear would be entirely dry and free from pain. Prior to the last attack, however, he was free from all aural symptoms for about eight consecutive months.

The examination showed the external auditory canal to be filled with a copious, brownish-yellow, foul-smelling pus. There was a good-sized carious opening through the posterior wall of the external auditory canal, and communicating with the mastoid antrum, through which pus was escaping. There was much swelling, redness, and tenderness over the mastoid process, extending upward to the superior border of the temporal bone, anteriorly to the outer canthus of the eye, and posteriorly to the occipital protuberance. Pressure on this swelling would force a large quantity of pus through the carious opening already mentioned into the external auditory canal. The posterior half of the membrana tympani was destroyed; the anterior portion, however, re-

mained intact and was quite normal in appearance.

Patient's temperature at this time registered 103°. Operation was advised and refused. The following day he returned, still suffering, the temperature rising to 104° at noon. Operative interference was strongly urged, but again refused. The next day he came again, at noon, his temperature at this time registering 105.2°. He was not able to secure sleep or relief from pain even under the influence of hypodermic medication. He now readily consented to an operation, and was admitted to the hospital for this purpose.

Operation: A free incision through the soft parts evacuated a large quantity of pus. This incision was carried from the tip of the mastoid to about one inch above the superior border of the auricle, and then forward to the outer canthus of the eye for a distance of about two inches. A transverse incision on a level with the mastoid antrum was carried almost to the occipital protuberance. This large field of operation was necessary on account of the extensive osteomyelitis present. In this particular case the extension from the diploe, which is usually first involved in cases of osteomyelitis, was external rather than internal, probably taking the course of least resistance. The entire external plate of bone was very dark, in some spots almost black, with numerous points of hemic ooze. All this area of necrotic bone was removed. There was a large carious opening in the mastoid process a little below the level of the antrum. The remaining part of the process was also discolored and showed many bleeding points. The necrosis was so great that the whole process was removed, including the tip. The sinus, as so frequently occurs in these chronic cases, was situated rather superficially and far forward, so much so that part of the posterior auditory canal acted as the anterior bony wall of the sinus. The necrotic process had exposed the entire sinus, which was bathed in pus, and covered with a thick layer of what seemed to be healthy granulation tissue, with the exception of one part. The granulation tissue was removed on account of some bleeding, and this bleeding was increased by the removal of this tissue, although no opening in the sinus could be found. The dura was largely exposed, both through the tympanic roof and the antrum. The discoloration of the dura through the antral opening was so marked that it suggested the possibility of some intradural abscess formation. A hypodermic needle was introduced for the purpose of diagnosis, but with negative results.

The septic temperature ranged from below normal to 106°, and continued for some days after the operation. The man at times became quite delirious, and the whole picture resembled one of septic sinus thrombosis. My own conviction, and the judgment of the various consultants, favored the opinion that the man was suffering from a general septicemia; hence no further operative interference was resorted to. The wisdom of this conservative decision was borne out by the fact that after the patient had passed through superficial multiple abscess formations in various parts of his body, he made a complete recovery.

Blood cultures and differential blood counts were made at various stages of this patient's illness. The former demonstrated the presence of the staphylococcus pyogenes albus, and the latter showed, as might be expected, a marked hyperleucocytosis and a decided increase of the polynuclear percentage. This relative ratio between the hyperleucocytosis and the polynuclear percentage continued throughout his illness, clearly demonstrating the value of the blood count in all septic conditions.

Frequent examinations of the eye-ground gave negative results.

One point of interest and importance to which I especially wish to direct your attention is the fact that we can hardly conceive that all the bone destruction shown in this case could have occurred in the three or four days which marked the acute exacerbation of the chronic recurrent suppurative otitis media, and yet the patient and his family claimed that for eight months prior to the date of this acute exacerbation he did not suffer the slightest inconvenience from

his ear and that the same remained entirely dry during that period.

This brings up for consideration the extensive pathologic changes that apparently take place without causing the patient any discomfort. We are frequently surprised at the extensive necrosis met with in operating for the relief of mastoid disease. This remark applies both to the acute and the chronic form of mastoid disease, but of course is much more common in the latter. From this experience, especially during epidemics of influenza, I am convinced that bone destruction does sometimes occur with little or no inconvenience, until a certain point has been reached. In other words, this furnishes us an additional argument in favor of comparatively early operative interference.

The fact that this patient was able to attend the dispensary service on three consecutive days, with a temperature ranging from 103° to 105°, would indicate that he possessed an unusually good constitution, and that he could not have had any serious intracranial involvement.

Case 2.—History: Another case which well illustrates the point under discussion is that of H. D., aged eighteen years, who suffered from a recurrent suppurative otitis media of the right ear from early childhood, the trouble recurring at intervals ever since. At times the discharge would cease for a period of about one year, the membrana tympani completely regenerating in the interval, the pain, however, being much worse during the period of cessation of discharge. Whooping-cough is the only disease from which the patient ever suffered, and this is said not to have had any influence on the aural condition.

An acute exacerbation occurred about two years ago and was very severe, the discharge lasting until he applied for treatment at the Jefferson Medical College Hospital, October 11, 1907. Examination at that time revealed the presence of a slight discharge in the external auditory canal escaping from a small perforation in the anteroposterior part of the membrana tympani, the remainder of the membrane being intact and looking fairly healthy. The Eustachian tube was patulous, an increased amount of secretion being forced through the perforation by the use of Valsalva's method of inflation. Deep pressure over the mastoid process elicited some tenderness. In order to provide for better drainage, the membrana tympani was freely incised and the patient placed on the usual line of treatment.

November 23, 1907, or about five weeks later, the drumhead was found to have entirely regenerated and was quite normal in appearance, the patient, however, complaining of severe pain over the mastoid process and the right side of the head, although with this exception there was not the slightest evidence of the classical symptoms of mastoid disease, as shown either by redness or swelling over the process or by any inflammatory condition of the drumhead. There was, however, some drooping and slight redness of the superior and posterior wall of the external auditory canal.

When the patient first applied for treatment, the mother was advised that an operation would probably be necessary. The condition had now improved to such an extent that we advised deferring operative interference. This did not meet with the approval of either the patient or his mother, the latter stating that the boy had been going through this process practically all his life, and she was convinced that the recurrence of pain on that side of his head would soon be followed by a reappearance of the discharge, and that at such times he usually became quite ill, with high fever, severe headache, nausea, vomiting, and great prostration.

Operation: Heath's operation was performed on December 6, 1907. Here again the mastoid was found to be of the diploic variety, the accompanying osteomyelitis extending back almost to the occipital protuberance. This, of course, offered a ready explanation of the pain on pressure over the mastoid and posterior to the same. As in the former case, extensive necrosis was found, especially over the sinus, exposing the same for almost its entire extent.

The sutures were removed and the dress-

ings changed six days after the operation. The wound was dressed every second day until January 2, 1908, when the patient was allowed to leave the hospital apparently well. On February 15, 1908, or about two months after the operation, the patient returned, the discharge having entirely ceased and the hearing having shown marked improvement. On April 17, or about four months after the operation, the patient again reported for examination. The membrana tympani was now entirely regenerated, and there was a complete cessation of the discharge. The hearing had improved almost to normal, and he was practically free from all discomfort.

The result, in so far as the hearing is concerned, shows the importance of resorting to a Heath or a modified radical operation in all suitable cases.

The destructive nature of a recurrent suppurative otitis media, to which little or no attention is usually paid, is well illustrated by a patient from the Far West on whom I recently operated.

Case 3.—History: Married woman, aged thirty-eight years. Without apparent cause she has had a recurrent suppurative otitis media of the left ear practically all her life. Up to eight years ago the discharge would appear about every two months. At that time, however, it ceased until nine months ago, when the acute exacerbation was ushered in with characteristic headache, nausea, and great lassitude, extending over a period of several days, until the discharge again appeared, which in turn relieved the pain considerably, as so often occurs. The otorrhea, however, had continued during this entire nine months. In June, 1907, she had an acute suppurative otitis media of the right ear, which was the first time this ear had been involved.

The patient consulted me April 7, 1908. She was found to be suffering severely with headache, confined to the left side. There was no swelling over the mastoid process, but she suffered from rather severe pain on gentle pressure over the mastoid, and extending for some distance posteriorly. There was a copious discharge escaping from the external auditory canal, of a brownish-yellow character, streaked with blood, and very offensive. The entire membrana tympani in this ear was practically destroyed, as well as the ossicles, which, however, were said to have been removed on a former occasion. The superior and posterior wall of the external auditory canal was very red, extremely sensitive, and drooping. The hearing was practically *nil.*

Operation: In this patient we found the cortex exceedingly hard, it being flint-like in character. The sinus was pushed far forward and exposed by the necrotic involvement. There was some necrosis of the bony roof of the mastoid antrum, which on being removed evacuated considerable pus from an extradural abscess.

The radical operation was performed in this case. The patient made an uninterrupted but rather slow recovery, on account of suffering from an intercurrent attack of purpura hemorrhagica with hemophilia, the bleeding taking place at many points over the entire surface of her body, but more especially in the throat and gums. Although no undue hemorrhage was met with at the time of the operation, there has been a tendency since that time to have some bleeding from the mastoid cavity. On the other hand, up to the present time there has been no recurrence of the purulent secretion. The vertigo from which she suffered prior to the operation has continued at intervals. This may be accounted for by some possible hemorrhagic invasion of the labyrinth.

Exacerbations Caused by Influenza.—Of seventeen mastoid operations performed by me in six consecutive days, during the second week of January, 1908, seven were of the recurrent variety. All showed extensive bone destruction, exposing either the sinus or dura or both. Two led to the evacuation of pus from a temporosphenoidal abscess, through the mastoid antrum route, and one assumed the Bezold variety of mastoid disease. Previous duration of the disease ranged from twenty-seven months to thirty-one years. The acute exacerbations occurred in two cases about every two months, and in the others about every two years or more. Four of the patients had not noticed any

discharge from the ear, nor experienced the slightest discomfort from the same for a period of three years or more. In one patient the ear had not discharged for six years, when a sinus thrombosis developed. In all these patients the acute exacerbations were complications of influenza.

Of about one hundred mastoid operations recently performed, twenty-one were of the recurrent variety. Of this number, eleven showed unexpected necrotic exposure of the sinus or interior of the skull. Two died during the acute exacerbation—one from an old encysted temporosphenoidal abscess, which ruptured as the result of an injury to the head, and the other from an infectious meningitis. In this latter case free pus was found in the cavernous and petrosal sinuses, the lateral sinus being apparently uninvolved. This patient enjoyed good health until his final and fatal attack, his previous exacerbation occurring more than twelve years before. The primary ear disease developed from epidemic measles forty-two years prior to this date.

During an attack of suppurative otitis media, especially when long-continued, the mucosa lining the tympanic cavity and accessory cavities first undergoes an ulcerative process, and this in turn becomes macerated and peels off, leaving a greater or less area of exposed osseous surface. With the protective and nutritive coat removed, the bone becomes an easy prey to the destructive influence of pathogenic microörganisms. Consequently it is hardly to be wondered at that so much necrosis of the bony structure should occur in such a large number of suppurative cases.

The location of the perforation in the membrana tympani would seem to offer some points in the diagnosis of serious intratympanic as well as mastoid caries. Although the rule is not constant, it nevertheless does occur with sufficient frequency to warrant the assumption that perforations situated superiorly and posteriorly in Shrapnell's membrane, and more especially if they exist in connection with drooping of the posterior and superior wall of the external auditory canal, are definite diagnostic indications of extensive caries of the tympanic cavity as well as of the mastoid process.

During suppuration the mucous membrane of the tympanic cavity shows hypertrophy, with the formation of vegetation or papillary growths, which may be large or small, discrete or confluent, extending along the inner wall of the cavity to the orifice of the Eustachian tube. As suppuration continues the epithelial cells desquamate and form large, whitish-yellow masses, which are composed of inspissated secretion and desquamated epithelium. These may be retained for an indefinite time unless infected by the staphylococcus, when they are converted into a foul-smelling discharge, consisting of bacteria and granular débris. Occasionally they assume a pearly-white appearance and remain in the middle-ear cavity as homogeneous masses or cholesteatomata.

The inward growth of the epidermis of the external meatus toward the tympanic cavity without the formation of cholesteatomata takes place more often than is generally supposed. On the other hand, secondary cholesteatomata are very often caused by the intrusion of the epidermis of the external meatus into the middle ear. They also develop in the middle ear itself, as shown by the presence of non-nucleated squamous cells. These cholesteatomatous masses may attain a considerable size without the least sign of caries or necrosis. On the other hand, it must be remembered that these epithelial accumulations or growths are probably more destructive, both to the soft and osseous structures, and cause more serious mastoid and intracranial complications than any form of infection.

In long-standing cases the horizontal walls of the semicircular canals may become eroded and the internal structures become the seat of inflammatory changes affecting the vestibular and cochlear aqueducts. This in turn may cause a cerebellar abscess, resulting from suppuration within the labyrinth, the pus having followed the auditory nerve and burrowed its way through the internal auditory meatus.

More especially during epidemics of in-

fluenza we meet a large number of serious mastoid cases, the cause of which cannot be definitely explained. In other words, from the patient's history, and in so far as can be seen, the middle ear was not involved. In cases of this kind, the bacteria and their toxins undoubtedly must have reached the mastoid by a hematogenous form of infection.

As is well known, recurrent cases may remain quiescent for some years, when the patient suddenly complains of severe pain in the head and ear of the same side. There is general hebetude, followed by chills, fever, vertigo, and vomiting, symptoms which frequently usher in some intracranial involvement.

In cases of a mild nature, or in which an intracranial complication is neither present nor in the course of development, the intensity of the above symptoms will be more or less modified, as the severity of the attack is governed entirely by the underlying involvement.

Diagnostic Value of Leucocytosis.—In considering the bacterial invasion of the temporal bone and the adjacent structures, we often speak of the presence and value of a leucocytosis. In this connection it is well to remember that a leucocytosis is a perfectly normal condition in the healthy state, and is, in fact, nature's method of providing scavengers for the destruction of the numerous microörganisms that are constantly invading the human economy. This leucocytosis, therefore, must necessarily vary in degree, depending entirely on the quantity and character of the toxins to be destroyed.

In the great majority of cases a normal leucocytosis is quite sufficient to destroy the hostile microbic incursion, but when the pathogenic organisms are numerous and virulent, a battle royal ensues between the leucocytes and the invading microbic army. In order to successfully meet and destroy the enemy, nature greatly increases the normal percentage of leucocytes, in which state the term hyperleucocytosis should be used, the antithesis being hypoleucocytosis or leucopenia, which naturally signifies an entirely different condition. The normal number of leucocytes varies from 6000 to 10,000 to the cubic millimeter. Hyperleucocytosis indicates an increase to 15,000 or more, and hypoleucocytosis or leucopenia is a decrease from the normal amount.

An examination of the blood is often an important link in the chain of symptoms which goes to make up the diagnosis in a septic process, but this examination must consist of the differential leucocyte count as distinguished from merely determining the presence of a hyperleucocytosis on the one hand, or leucopenia on the other.

The condition in sepsis, in the majority of cases, shows a decided increase in the leucocytes, but this is by no means constant, for as great an authority as Grawitz states that "not rarely active inflammatory processes with suppuration may be present without hyperleucocytosis occurring."

Leucocytosis gauges the combative powers an individual possesses and can use against the infection by which he is attacked, but it does not show the strength of that infection. Thus, in trifling infections in which the activity of the leucocytes is insufficient, and also in fatal cases in which the system is overwhelmed by the toxins, hyperleucocytosis does not develop and even leucopenia may be absent. Facts such as these render the occurrence of hyperleucocytosis in sepsis an inconstant phenomenon. An early development and rapid increase in the number of leucocytes is decidedly in favor of septic disease. We have, however, a good index to the severity of the septic process in the relative percentage of polynuclear leucocytes. Normally there is present a variation of from 59 to 68 per cent of these cells, with a mean percentage of 61. Therefore, if a patient presents a blood-picture in which the relative polynuclear percentage is above 80, it indicates absorption of pus from some part of the body. Pus is seldom found with a relative percentage of less than 80 unless the patient is a child, in which case it may be as low as 73. However, pus should be suspected and looked for in all cases in which the polynuclear percentage is above 70.

In addition to the hyperleucocytosis there is at times another element which may be

determined from the examination of the blood, namely, the demonstration of the special microörganism, often in almost pure culture. It is never sufficient to content ourselves with a single culture of the blood, but this should be repeated, and in addition, various culture media should be employed.

The relations of the ear to sepsis are extremely important. Ponfick examined the ears in one hundred children whose ages varied from one month to four years, and who had succumbed to various diseases. The autopsies revealed that 78 times there was bilateral, and 13 times unilateral, otitis media. In only nine cases was the middle ear normal.

From the foregoing it would seem that we have at our command a valuable asset, which, when properly worked out, may throw much invaluable light on certain forms of sepsis. For example, in cases of recurrent suppurative otitis media, during the stage of *apparent* inactivity, or in other words, between the periods that mark the acute exacerbations, it may be possible, by an examination of the blood, to demonstrate that a retrogressive metamorphosis is in actual progress. The value of such findings would at once become apparent if we were enabled thereby to appreciate such conditions, even in the absence of certain localizing symptoms.

A STUDY OF THE ENZYMES OF THE HUMAN PANCREATIC AND INTESTINAL JUICE OBTAINED THROUGH A JEJUNAL FISTULA.

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Human gastric juice obtained through a gastric fistula has been frequently studied. However, chances for a direct examination of the contents of the small intestine below the duodenum rarely present themselves. A case in which operative procedure led to the formation of a jejunal fistula which had to be kept open for several weeks furnished occasion to obtain through this fistula the intestinal contents and to study them with reference to the presence of pancreatic and intestinal enzymes, and with reference to the action and absorption of certain medicinal substances.

The case from which the jejunal contents were obtained presented, in brief, the following features:

Patient, female, aged sixteen, had acute intestinal obstruction following appendicitis. When surgical intervention was sought the patient's condition was serious, and the laparotomy revealed surgical phases that made it necessary to open the jejunum and then establish an external drainage. Fully two months had elapsed before the juices were collected in sterilized rubber bags, which were not allowed to remain in contact with the wound beyond ten hours. Upon removal the bag and contents promptly were delivered to the chemist.

During the investigations the patient was on a diet consisting of the usual foods, such as meat, bread, vegetables, fats, eggs, etc.

The contents of the jejunum, as obtained through the fistula, which was situated about 22 inches from the duodenum, were studied particularly as to the presence of enzymes. These enzymes were tested as to their susceptibility toward certain medicinal substances. Afterward the same drugs, namely, salol, aspirin, and sodium salicylate, were given to the patient to see whether their effect in the body would correspond to their effect in the test-tube experiment. Aspirin was given in five-grain doses every three hours for twenty-four hours; salol in three-grain doses every three hours; and sodium salicylate in five-grain doses every three hours. The collection of the intestinal contents was begun three hours after the first dose of the drugs named had been given, and continued for twenty-four hours.

The intestinal contents as obtained through the fistula about ten to twelve times never showed any free HCl; sometimes a small amount of combined HCl could be demonstrated; generally the contents were faintly alkaline to phenolphthalein and decidedly so toward litmus.

Occasionally the contents were of a more

fluid character, particularly once after the administration of calomel; generally, however, they were of the consistency of a moist mash, usually yellowish-green in color and not fetid at all.

Of the mashes obtained through the fistula, watery and glycerin extracts were made. Particularly the glycerin extracts, to which was added a little thymol, were very satisfactory, since the intestinal enzymes kept well in them for days before a gradual weakening became noticeable. The enzymes found in this manner and studied were an amylolytic, a proteolytic ferment, and the fat-splitting ferment lipase. The amylolytic ferment found in the glycerin extracts could not have been the ptyalin found in the saliva of the mouth and mixed in the mastication of the food with the latter, because it was shown in a number of experiments made that this amylolytic ferment was very susceptible to mineral acids, did not act in the presence of them, and was soon destroyed under their influence. It acted well in a neutral or slightly alkaline solution. The ptyalin of the saliva having been subjected to the action of the HCl in the stomach, must have been destroyed before it reached the small intestine. Hence it appears reasonable to conclude that the amylolytic ferment found in the extract from the contents of the small intestine must have been furnished by the pancreas. It was also shown by systematic comparative experiments that the amylolytic ferment present in the contents of the small intestine was very susceptible to the action of salicylic acid and aspirin, but its action was not much hindered even if larger amounts of carbolic acid or salicylate of soda were present.

After the administration of larger medicinal doses of salicylate of sodium, salol, and aspirin, the contents obtained through the fistula were first examined for these substances or for their "Spaltungs products," carbolic acid and salicylic acid. However, not in a single instance did we succeed in showing the presence of them; hence it appears that they must have been absorbed in the stomach or higher up in the duodenum or jejunum above the site of the fistula.

Theoretically we had expected to find after the administration of salol or aspirin a very much weakened amylolytic ferment, but the latter obtained after the administration of the drugs mentioned showed only a slight degree of damage, if any, very probably because the medicines had been absorbed already when the amylopsin was secreted from the pancreas into the duodenum. Calomel likewise showed no effect upon the ferments, nor subnitrate of bismuth, the only medicines given which could be easily found in the mass obtained through the fistula.

A very interesting result of the study of the amylolytic ferment was the positive proof of the presence of the ferment which changes maltose into glucose, namely, the enzyme known as glucase. It could be shown that part of the sugar formed in the experiments was glucose; this was due to the presence of an active glucase furnished by the succus entericus of the small intestine.

It could be shown by other experiments that the proteolytic ferment present was trypsin and not pepsin; it acted best in an alkaline, poorer in a neutral, and very poor or not at all in an acid solution. Besides, in one experiment the presence of leucin and tyrosin as the end-product of the proteolytic fermentation was shown. This proved beyond doubt that the proteolytic ferment present was trypsin. Only once did we succeed in demonstrating the presence of lipase; but it is a well-known fact that the latter is a very unstable enzyme, easily destroyed and hard to obtain except by direct watery extracts from fresh pancreatic tissue.

Aside from the interesting facts above mentioned the clinician is confronted with the question, Are aspirin and salol decomposed in the small intestine or stomach? Theoretically, they should be decomposed in the small intestine, and it is consistent with this theory to assume that drugs having well-defined chemical composition should modify the enzymes in the small intestine and also respond to tests for the end-products of decomposition. The complete failure to discover the end-products reopens

the question in its entirety, and the experimental researches herein described negative the theory that these drugs are split up in the small intestine. In proof of this assertion note that aspirin when mixed with the intestinal contents as obtained from the jejunum modifies the enzyme activity positively to the extent of completely annihilating amylolytic activity when present in the strength of 1:1000. If aspirin when given per os were always decomposed in the small intestine, it is consistent to expect that the inhibition would also occur under these circumstances. Aspirin in all likelihood is absorbed before it comes in contact with the pancreatic secretions.

According to these experiments salol is also absorbed before contact with the pancreatic juices. Another factor in favor of this view is the not uncommon experience that the salol test sometimes gives normal results in stenosis of the pylorus.

This subject assumes much importance in the minds of clinicians when applied to diabetes and so-called intestinal indigestion. Aspirin has been used extensively in diabetes apparently with effect on the sugar content of the urine. If it were true that this drug is split up in the small intestine and there exerts antiamylolytic effects, one could understand its effects on the sugar content in the urine. What effect, if any, aspirin has in diabetes is an unsettled question and open to much research.

The use of salol as an intestinal antiseptic is negatived for the same reasons that apply to the assimilation of aspirin. Calomel had no effect other than an apparent increase in the fluidity of the intestinal contents, and aside from indicating that its action on the intestine or pancreas begins high up no other conclusions could be arrived at. On one occasion Turck's intestinal pills were given. All were discharged through the fistulous opening unchanged and undissolved.

On account of the great difficulty encountered in carrying out more extensive researches regarding intestinal pills no other experiments were made. Aside from noting that Dr. Maximilian Herzog carried out the chemical analyses, the courtesy of Dr. Carl Beck made it possible to obtain the material for this work.

The following is a detailed account of the experiments made and their outcome, which led to the conclusions briefly summarized in the above introductory remarks:

May 27, 1907, two samples were received, one in a small rubber bag, consisting of about 15 Cc. of a cloudy, dirty-greenish fluid with small vegetable fragments floating in it. A preliminary test showed this fluid to be alkaline to litmus but acid to phenolphthalein. The fluid was then filtered and the filtrate subjected to various tests, with the following results:

Test for free HCl .....negative.
Test for lactic acid .....negative.
Test for bile .....positive.
Test for starch .....negative.
Test for sugar .....negative.
Test for peptone .....negative.

Ten Cc. of the filtrate was then titrated with N/10 sol. NaHO, with phenolphthalein as an indicator. Ten Cc. of the filtrate required 1.6 N/10 sol. NaHO for saturation until color of indicator turned. Hence the acidity of the 10 Cc. calculated as HCl was equal to 0.584 HCl per 1000 of the filtered juice. The acidity was all due to combined HCl, since the dimethylamidoazobenzol and the alizarin tests were negative.

The mass in the large rubber bag consisted of undigested food, including much well-recognizable corn. Of this mass 30 grammes was taken and rubbed up in a mortar with 100 Cc. of 60-per-cent glycerin (40-per-cent aq. dest.). After thorough mixture with the dilute glycerin the thick, pasty mass was placed on a filter and a piece of thymol was placed in it. A small piece of thymol was also placed in the bottle which was to receive the filtrate. The filtered glycerin extract was removed after twenty-four hours and used for a number of tests (see below).

EXPERIMENTS WITH THE FILTERED FRESH JUICE.

Experiment No. I.

To 10 Cc. of a 4-per-cent starch paste in test-tubes 1 Cc. of the filtered fresh juice was added to each, as follows:

Test-tube No. 1: 10 Cc. starch paste + 1 Cc. juice.

Test-tube No. 2: 10 Cc. starch paste + 3 drops N/10 sol. H_2SO_4 + 1 Cc. juice.

Test-tube No. 3: 10 Cc. starch paste + 3 drops N/10 sol. NaHO + 1 Cc. juice.

The tubes were kept for thirty minutes in the incubator at 38° C., and then—to interrupt amylolytic fermentation—immersed in boiling water. After cooling the contents of the test-tubes were examined, with the following result:

Test-tube No. 1 contained amylodextrin, erythrodextrin, achroödextrin, 163 mgms. sugar.

Test-tube No. 2 contained amylodextrin, erythrodextrin, achroödextrin, 43.7 mgms. sugar.

Test-tube No. 3 contained amylodextrin, erythrodextrin, achroödextrin, 14.2 mgms. sugar.

The result of this experiment shows that the fresh filtered juice contained a quite active amylolytic ferment. The action of this ferment was greatly inhibited by even a small amount of acid (H_2SO_4), and markedly reduced by a proportionate amount of alkali (NaHO).

Experiment No. II.

To test-tubes containing 10 Cc. of a 4-per-cent paste 1 Cc. of glycerin extract No. 1 was added and varying amounts of acid and alkali, as follows:

Tube No. 11: 10 Cc. 4-per-cent starch paste + 0 Cc. N/10 sol. HCl + 5 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 12: 10 Cc. 4-per-cent starch paste + 1 Cc. N/10 sol. HCl + 4 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 13: 10 Cc. 4-per-cent starch paste + 2 Cc. N/10 sol. HCl + 3 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 14: 10 Cc. 4-per-cent starch paste + 3 Cc. N/10 sol. HCl + 2 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 15: 10 Cc. 4-per-cent starch paste + 4 Cc. N/10 sol. HCl + 1 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 16: 10 Cc. 4-per-cent starch paste + 5 Cc. N/10 sol. HCl + 0 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 17: 10 Cc. 4-per-cent starch paste + 1 Cc. N/10 sol. NaHO + 4 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 18: 10 Cc. 4-per-cent starch paste + 2 Cc. N/10 sol. NaHO + 3 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 19: 10 Cc. 4-per-cent starch paste + 3 Cc. N/10 sol. NaHO + 2 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 20: 10 Cc. 4-per-cent starch paste + 4 Cc. N/10 sol. NaHO + 1 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 21: 10 Cc. 4-per-cent starch paste + 5 Cc. N/10 sol. NaHO + 0 Cc. H_2O + 1 Cc. glycerin extract No. 1.

The tubes were kept for one hour in the incubator at 38° C.; then the fermentation was interrupted by immersion in boiling water. Result of experiment:

Tube No. 11: Amylodextrin, erythrodextrin, achroödextrin, 264.2 mgms. sugar.

Tube No. 12: Traces of the three dextrins, 0 mgms. sugar.

Tube No. 13: No change.

Tube No. 14: No change.

Tube No. 15: No change.

Tube No. 16: No change.

Tube No. 17: Amylodextrin, erythrodextrin, achroödextrin, 25 mgms. sugar.

Tube No. 18: Traces of the three dextrins; trace of sugar.

Tube No. 19: No change.

Tube No. 20: No change.

Tube No. 21: No change.

The result of this experiment shows that the glycerin extract contained an active amylolytic ferment, which showed the well-known susceptibility for mineral acids and a lesser susceptibility for alkali.

The sugar formed in the foregoing experiments had been calculated as maltose. The following experiment was made to determine whether the glycerin extract did not also contain the ferment which changes maltose into dextrose (glucose):

Experiment No. III.

To 200 Cc. of a 4-per-cent starch paste 5 Cc. of glycerin extract No. 1 was added and the flask kept in the incubator at 38° C. After one hour the iodine test showed the presence of the three dextrins, amylodextrin, erythrodextrin, achroödextrin. After several hours there was very little amylodextrin present, and much erythro- and

achroödextrin. But even after twenty-four hours the dextrin had not all been changed to achroödextrin, and much erythro- and very little amylodextrin was present. Therefore, 10 Cc. of another glycerin extract, to be designated as No. 2, was added.

Finally, after three hours, the contents of the bottle were brought to boiling and filtered. The filtrate by titration with Fehling's solution showed 2.4475 sugar, calculated as maltose.

The filtrate was then evaporated down and acetate of soda and hydrochlorate of phenylhydrazin added to obtain the sugar as an ozazon. However, it did not crystallize out well and the experiment was abandoned, and a new one, with a stronger starch paste, made later.

Experiment No. IV.

About ½ gramme of fresh butter was placed in a test-tube, and to it was added 5 Cc. N/10 sol. NaHO+5 Cc. H_2O+4 Cc. of glycerin extract No. 1. The test-tube was then well shaken so that its contents became emulsified. It was then placed in the incubator at 38° C. and kept there for three and a half hours. During that time a faint, though distinct, smell of butyric acid developed. After 3½ hours the contents of the test-tube were washed into a beaker, and they were titrated with N/10 sol. HCl with phenolphthalein as an indicator. This titration showed a loss of 1.5 N/10 sol. NaHO. This, of course, represents the amount neutralized by the fatty acid formed in consequence of fat-splitting by lipase present in the glycerin extract No. 1.

The result of this experiment showed the presence of lipase in the glycerin extract.

Experiment No. V.

The following solutions were prepared to make tests for the presence of the peptic and tryptic enzymes:

Flask No. V "A" contained 10 Cc. fresh egg-albumen, 60 Cc. N/10 sol. NaHO, 45 Cc. H_2O, 5 Cc. glycerin extract No. 1.

Flask No. V "B" contained 10 Cc. fresh egg-albumen, 60 Cc. N/10 sol. HCl, 45 Cc. H_2O, 5 Cc. glycerin extract No. 1.

Both flasks were well shaken, and were then kept in the incubator at 38° for three hours. In order to bring the fermentation to a stop the contents of the two flasks were then brought to boiling. On boiling the contents of flask "A" remained clear, while in flask "B" several flocculent, coagulated masses showed up. It therefore appeared at once that the proteolytic fermentation had been more advanced in "A" (alkaline) than in "B" (acid).

The contents of flask "A" were then filtered and the filtrate carefully neutralized with dilute H_2SO_4. No alkaline albuminate evidently being present, the neutralized fluid remained clear. Next acetic acid was added to the contents of flask "A" and the thoroughly acidulated fluid was boiled. A moderate amount of coagulable albumens were then precipitated and removed by filtration. The fluid was then treated with an excess of saturated solution of ammonium sulphate, whereupon a moderate amount of albumoses were precipitated and filtered out. The filtrate then gave the peptone reaction. The final filtrate was then evaporated down, and in the thick mass a few leucin and tyrosin crystals were seen. Piria's test for tyrosin gave a very faint reaction only. Evidently the fermentation had not been carried far enough, so that leucin and tyrosin had only been developed in traces. However, the result of the experiment showed the presence of active trypsin in the mass obtained through the fistula.

The result of the examination of the contents of flask "B" showed very little converted hydrolyzed albumen, only a trace of albumoses separating out on saturation with sulphate of ammonia. Test for peptone showed only the faintest possible trace. Hence it appears that while the contents of the small intestine removed contained a good deal of active trypsin, there was hardly any active pepsin recovered in the glycerin extract.

Experiment No. VI.

To determine whether the sugar formed is maltose or glucose:

To about 400 Cc. of a thick starch paste 50 Cc. of glycerin extract No. 2 was added and the solution was made up to 500 Cc. It was then kept in the incubator at 38° C. for twenty-four hours. The contents of the

flask were then boiled to stop the amylolytic fermentation. The filtrate showed the presence of amylo-, erythro-, and achroödextrin and sugar (calculated as maltose) 2.456. The fluid shaken with animal charcoal and filtered again is dextrorotary (calculated as glucose Schmidt Haensch polariscope), 7.25 per cent. This strong dextrorotary power is due to the presence of the dextrorotary dextrins. A number of qualitative tests were then made, and these showed that the sugar present most probably consisted of a mixture of glucose and maltose. The great bulk of the filtrate was then evaporated down to precipitate the sugar as an ozazon after the addition of phenylhydrazin and acetate of soda. The precipitation was several times redissolved and recrystallized. Finally, some of the ozazon crystals were collected on a weighed filter and dried in the drying oven and desiccator until constant in weight. The ozazon so obtained weighed 361 mgms. The nitrogen was then determined by Kjeldahl's method:

Glucosazon: $C_{18}H_{22}N_4O_4$ M.W. 358.

Maltosazon: $C_{24}H_{32}N_4O_9$ M.W. 520.

Percentage of N in glucosazon, 15.64.

Percentage of N in maltosazon, 10.77.

Calculated nitrogen in 361 mgms. glucosazon, 56.46 mgms.

Calculated nitrogen in 361 mgms. maltosazon, 38.88 mgms.

Found 46.48 mgms. N by Kjeldahl's method in the .361 gramme of material.

Hence, it was shown that part of the sugar was glucose; if all had been maltose not more than 38.88 mgms. of N could have been found.

May 31, 1907, 3.00 P.M., received about 75 to 90 Cc. of a mash obtained six hours after the ingestion of meat. Microscopic examination shows numerous crystals of bismuth subnitrate bile-stained; also meat fibers in all stages of digestion, some almost completely dissolved, others with much loss in striation, others with distinct transverse and longitudinal striations; also found vegetable fibers and cells.

Glycerin extract prepared in the usual manner, to be designated as glycerin extract No. 3.

Experiment No. VII.

Tube No. 1: 10 Cc. 4-per-cent starch paste + 11 Cc. 0.1 per cent sol. salicylic acid + 0 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 2: 10 Cc. 4-per-cent starch paste + 10 Cc. 0.1 per cent sol. salicylic acid + 1 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 3: 10 Cc. 4-per-cent starch paste + 9 Cc. 0.1 per cent sol. salicylic acid + 2 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 4: 10 Cc. 4-per-cent starch paste + 8 Cc. 0.1 per cent sol. salicylic acid + 3 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 5: 10 Cc. 4-per-cent starch paste + 7 Cc. 0.1 per cent sol. salicylic acid + 4 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 6: 10 Cc. 4-per-cent starch paste + 6 Cc. 0.1 per cent sol. salicylic acid + 5 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 7: 10 Cc. 4-per-cent starch paste + 5 Cc. 0.1 per cent sol. salicylic acid + 6 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 8: 10 Cc. 4-per-cent starch paste + 4 Cc. 0.1 per cent sol. salicylic acid + 7 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 9: 10 Cc. 4-per-cent starch paste + 3 Cc. 0.1 per cent sol. salicylic acid + 8 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 10: 10 Cc. 4-per-cent starch paste + 2 Cc. 0.1 per cent sol. salicylic acid + 9 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 11: 10 Cc. 4-per-cent starch paste + 1 Cc. 0.1 per cent sol. salicylic acid + 10 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 12: 10 Cc. 4-per-cent starch paste + 0 Cc. 0.1 per cent sol. salicylic acid + 11 Cc. H_2O + 1 Cc. glycerin extract No. 2.

The tubes were kept in the incubator for twenty-four hours. Result:

No. 1: No change in starch.

No. 2: No change in starch.

No. 3: No change in starch.

No. 4: Traces of the dextrins. No sugar.

No. 5: Traces of the dextrins. No sugar.

No. 6: Traces of the dextrins. Trace of sugar.

No. 7: Traces of the dextrins. Trace of sugar.

No. 8: Traces of the dextrins, marked. About 25 mgms. maltose.

No. 9: Three dextrins present, 121 mgms. maltose.

No. 10: Three dextrins present, 181 mgms. maltose.

No. 11: Three dextrins present, 208 mgms. maltose.

No. 12: Three dextrins present, 164 mgms. maltose.

The result of this experiment shows that the amylolytic ferment contained in the glycerin extract is very susceptible to salicylic acid. When present in a proportion of 7 to 22,000 or about 1:3000 it almost completely prevented any conversion into sugar. When present in a proportion of 8 to 22,000 a small amount (25 mgms.) of maltose was formed. When present in a very minute proportion, 1 to 22,000 and 2 to 22,000, the salicylic acid slightly stimulated the amylolytic conversion of starch into maltose.

On June 3, 1907, there were received test-tube marked No. 1, containing a piece of catheter, and a little perforated rubber sac containing a small piece of meat. Piece of meat shaken with aq. dest. This aq. dest. united with small amount of juice in test-tube. Fluid neutral; test for peptone negative. On boiling, some turbidity. Meat examined microscopically. Striation well preserved.

No. 2: Meat shaken with aq. dest., then filtered. Filtrate contained much coagulable albumens; was faintly alkaline; gave faint peptone reaction. Microscopically, striation still distinct.

Experiment No. VIII.

This experiment was made to determine the effect of salicylate of soda upon the action of the amylolytic ferment.

Tube No. 1: 10 Cc. 4-per-cent starch paste + 11 Cc. 0.1 per cent sol. salicylate of soda + 0 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 2: 10 Cc. 4-per-cent starch paste + 10 Cc. 0.1 per cent sol. salicylate of soda + 1 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 3: 10 Cc. 4-per-cent starch paste + 9 Cc. 0.1 per cent sol. salicylate of soda + 2 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 4: 10 Cc. 4-per-cent starch paste + 8 Cc. 0.1 per cent sol. salicylate of soda + 3 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 5: 10 Cc. 4-per-cent starch paste + 7 Cc. 0.1 per cent sol. salicylate of soda + 4 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 6: 10 Cc. 4-per-cent starch paste + 6 Cc. 0.1 per cent sol. salicylate of soda + 5 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 7: 10 Cc. 4-per-cent starch paste + 5 Cc. 0.1 per cent sol. salicylate of soda + 6 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 8: 10 Cc. 4-per-cent starch paste + 4 Cc. 0.1 per cent sol. salicylate of soda + 7 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 9: 10 Cc. 4-per-cent starch paste + 3 Cc. 0.1 per cent sol. salicylate of soda + 8 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 10: 10 Cc. 4-per-cent starch paste + 2 Cc. 0.1 per cent sol. salicylate of soda + 9 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 11: 10 Cc. 4-per-cent starch paste + 1 Cc. 0.1 per cent sol. salicylate of soda + 10 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 12: 10 Cc. 4-per-cent starch paste + 0 Cc. 0.1 per cent sol. salicylate of soda + 11 Cc. H_2O + 1 Cc. glycerin extract No. 2.

The glycerin extract No. 2 used in this experiment when employed was eight days old. The tubes were incubated for about four hours at 39° C.; the fermentation was then interrupted.

The examination of the contents of the twelve test-tubes showed that the salicylate of sodium in the small percentages used (1:2200 to 1 to 22,000) had no effect at all. The amount of sugar formed in the different test-tubes varied from 304 to 366 mgms., but any decided influence of the sodium salicylate was not demonstrable.

Experiment No. IX.

In the experiment salicylate of sodium was used in higher percentages.

Tube No. 1: 10 Cc. 4-per-cent starch paste + 9 Cc. 2-per-cent sol. salicylate of soda + 0 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 2: 10 Cc. 4-per-cent starch paste + 8 Cc. 2-per-cent sol. salicylate of soda + 1 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 3: 10 Cc. 4-per-cent starch paste + 7 Cc. 2-per-cent sol. salicylate of soda + 2 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 4: 10 Cc. 4-per-cent starch paste + 6 Cc. 2-per-cent sol. salicylate of soda + 3 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 5: 10 Cc. 4-per-cent starch paste + 5 Cc. 2-per-cent sol. salicylate of soda + 4 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 6: 10 Cc. 4-per-cent starch paste + 4 Cc. 2-per-cent sol. salicylate of soda + 5 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 7: 10 Cc. 4-per-cent starch paste + 3 Cc. 2-per-cent sol. salicylate of soda + 6 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 8: 10 Cc. 4-per-cent starch paste + 2 Cc. 2-per-cent sol. salicylate of soda + 7 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 9: 10 Cc. 4-per-cent starch paste + 1 Cc. 2-per-cent sol. salicylate of soda + 8 Cc. H_2O + 1 Cc. glycerin extract No. 1.

Tube No. 10: 10 Cc. 4-per-cent starch paste + 0 Cc. 2-per-cent sol, salicylate of soda + 9 Cc. H_2O + 1 Cc. glycerin extract No. 1.

The tubes were kept in the incubator at 39° C. for two hours and fifteen minutes; then the fermentation was interrupted and the amounts of maltose present in the flasks were determined, as follows:

Tube No. 1: Dextrins present, 155 mgms. sugar.

Tube No. 2: Dextrins present, 170 mgms. sugar.

Tube No. 3: Dextrins present, 186 mgms. sugar.

Tube No. 4: Dextrins present, 177 mgms. sugar.

Tube No. 5: Dextrins present, 189 mgms. sugar.

Tube No. 6: Dextrins present, 184 mgms. sugar.

Tube No. 7: Dextrins present, 194 mgms. sugar.

Tube No. 8: Dextrins present, 196 mgms. sugar.

Tube No. 9: Dextrins present, 194 mgms. sugar.

Tube No. 10: Dextrins present, 202 mgms. sugar.

The result of this experiment shows that even if present to the extent of one per cent salicylate of sodium has only a moderately inhibitory influence upon the amylolytic action obtained from the small intestine.

Experiment No. X.

This experiment was made to determine the effect of carbolic acid upon the action of the amylolytic ferment.

Tube No. 1: 10 Cc. 4-per-cent starch paste + 9 Cc. 5-per-cent sol. carbolic acid + 0 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 2: 10 Cc. 4-per-cent starch paste + 8 Cc. 5-per-cent sol. carbolic acid + 1 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 3: 10 Cc. 4-per-cent starch paste + 7 Cc. 5-per-cent sol. carbolic acid + 2 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 4: 10 Cc. 4-per-cent starch paste + 6 Cc. 5-per-cent sol. carbolic acid + 3 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 5: 10 Cc. 4-per-cent starch paste + 5 Cc. 5-per-cent sol. carbolic acid + 4 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 6: 10 Cc. 4-per-cent starch paste + 4 Cc. 5-per-cent sol. carbolic acid + 5 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 7: 10 Cc. 4-per-cent starch paste + 3 Cc. 5-per-cent sol. carbolic acid + 6 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 8: 10 Cc. 4-per-cent starch paste + 2 Cc. 5-per-cent sol. carbolic acid + 7 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 9: 10 Cc. 4-per-cent starch paste + 1 Cc. 5-per-cent sol. carbolic acid + 8 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 10: 10 Cc. 4-per-cent starch paste + 0 Cc. 5-per-cent sol. carbolic acid + 9 Cc. H_2O + 1 Cc. glycerin extract No. 2.

The glycerin extract No. 2 used in this experiment when employed was eight days old. The tubes were incubated for about two and a half hours at 39° C.; the fermentation was then interrupted. Result of the experiment:

Tube No. 1: Dextrins present, 267 mgms. sugar.

Tube No. 2: Dextrins present, 278 mgms. sugar.

Tube No. 3: Dextrims present, 288 mgms. sugar.

Tube No. 4: Dextrins present, 267 mgms. sugar.

Tube No. 5: Dextrins present, 287 mgms. sugar.

Tube No. 6: Dextrins present, 260 mgms. sugar.

Tube No. 7: Dextrins present, 297 mgms. sugar.

Tube No. 8: Dextrins present, 315 mgms. sugar.

Tube No. 9: Contents of tube lost.

Tube No. 10: Dextrins present, 323 mgms. sugar.

The result of this experiment shows that carbolic acid even when present to the extent of 2½ per cent did not much hinder the action of the amylolytic ferment in glycerin extract No. 2.

Experiment No. XI.

This experiment was made to ascertain the effect of aspirin (monoacetic acid ester of salicylic acid) upon the action of the amylolytic ferment in glycerin extract No. 2.

Tube No. 1: 10 Cc. 4-per-cent starch paste + 9 Cc. 0.2-per-cent sol. aspirin + 0 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 2: 10 Cc. 4-per-cent starch paste + 8 Cc. 0.2-per-cent sol. aspirin + 1 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 3: 10 Cc. 4-per-cent starch paste + 7 Cc. 0.2-per-cent sol. aspiri + 2 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 4: 10 Cc. 4-per-cent starch paste + 6 Cc. 0.2-per-cent sol. aspirin + 3 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 5: 10 Cc. 4-per-cent starch paste + 5 Cc. 0.2-per-cent sol. aspirin + 4 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 6: 10 Cc. 4-per-cent starch paste + 4 Cc. 0.2-per-cent sol. aspirin + 5 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 7: 10 Cc. 4-per-cent starch paste + 3 Cc. 0.2-per-cent sol. aspirin + 6 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 8: 10 Cc. 4-per-cent starch paste + 2 Cc. 0.2-per-cent sol. aspirin + 7 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 9: 10 Cc. 4-per-cent starch paste + 1 Cc. 0.2-per-cent sol. aspirin + 8 Cc. H_2O + 1 Cc. glycerin extract No. 2.

Tube No. 10: 10 Cc. 4-per-cent starch paste + 0 Cc. 0.2-per-cent sol. aspirin + 9 Cc. H_2O + 1 Cc. glycerin extract No. 2.

The tubes were kept in the incubator at 39° C. for two hours and thirty minutes; the fermentation was then interrupted. Result of the experiment:

Tube No. 1: No conversion of the starch at all.

Tube No. 2: Trace of dextrins. Trace of sugar.

Tube No. 3: Small amounts of dextrins, 87 mgms. sugar.

Tube No. 4: Small amounts of dextrins, 79 mgms. sugar.

Tube No. 5: Small amounts of dextrins, 85 mgms. sugar.

Tube No. 6: Larger amounts of dextrins, 178 mgms. sugar.

Tube No. 7: Larger amounts of dextrins, 184 mgms. sugar.

Tube No. 8: Larger amounts of dextrins, 202 mgms. sugar.

Tube No. 9: Larger amounts of dextrins, 201 mgms. sugar.

Tube No. 10: Larger amounts of dextrins, 189 mgms. sugar.

The result of this experiment shows that aspirin present in a proportion of 1:1100 entirely prevented the action of the amylolytic ferment. When present in a proportion of 1 in 2000 it still showed a strong hindering influence, but when present in a proportion of 1:2500 it had only a very feebly detrimental effect, while if present in the small proportion of 1:5000 it appears to have somewhat stimulated amylolytic fermentation.

Experiment No. XII.

This experiment was made to test with each other the amylolytic ferments of the various extracts on hand.

To four flasks containing 95 Cc. of a 4-per-cent starch paste 5 Cc. of the four extracts were added. The flasks were then kept in the incubator at 40° C. for eighteen hours. Then the fermentation was interrupted in the usual manner.

The sugars were determined by titration with Fehling's solution, calculated as maltose:

Flask 1: +5 Cc. extract No. 2, maltose formed 2.201 grms.

Flask 2: +5 Cc. extract No. 3, maltose formed 2.071 grms.

Flask 3: +5 Cc. extract No. 4, maltose formed 2.188 grms.

Flask 4: +5 Cc. extract No. 5, maltose formed 1.934 grms.

It appears from the result of this experiment that the glycerin extracts were fairly well alike in amylolytic power; it also appears that extract No. 2, which was about ten days old, had not lost any of its amylolytic power. Extracts Nos. 4 and 5 respectively obtained after calomel and after salicylate of soda medication showed no loss in amylolytic power.

On June 11, 1907, another rubber bag with some of the intestinal contents obtained through the fistula was received. These contents were collected after salol had been given. The mash presented the usual appearance. It did not exhibit any peculiarity of color or smell (no carbolic

acid smell). The mass was divided into two portions. One portion was mixed with water by stirring and the aqueous filtrate was tested for carbolic acid and for salicylic acid. Both tests were negative. The second portion was rubbed up with 100 Cc. of a 70-per-cent glycerin-water mixture, and the filtrate collected and designated as glycerin extract No. 6.

Experiment No. XIII.

1.795 of pure butter, obtained by extracting cream, was divided into two approximately equal portions; about 60 Cc. of hot distilled water was then shaken with each one of the two portions of butter fat. A little phenolphthalein solution was then added until the emulsion gave a faint alkaline reaction. Then 5 Cc. of glycerin extract was added to each of the two flasks; however, one flask was to be used as a control, hence the glycerin extract was boiled. The two flasks were then again titrated with N/10 sol. NaHO till faintly alkaline and the contents finally made up to 100 Cc., whereupon the flasks were placed in the incubator (39° C.) in order to demonstrate the presence or absence of lipase. (Glycerin extract No. 6 was found to be acid to phenolphthalein—3 Cc. N/10 sol. NaHO for 100 Cc. of the extract, or 109.5 mgms. of HCl per 1000 Cc. of the extract.) The result of the experiment showed that there was no active lipase present in extract No. 6.

Experiment No. XIV.

This experiment was made to test the amylolytic power of extract No. 6.

Tube No. 1: 10 Cc. 4-per-cent starch paste + 9 Cc. H_2O + 1 Cc. glycerin extract No. 6.

Tube No. 2: 10 Cc. 4-per-cent starch paste + 9 Cc. H_2O + 1 Cc. glycerin extract No. 6.

Tube No. 3: 10 Cc. 4-per-cent starch paste + 9 Cc. H_2O + 1 Cc. glyce in extract No. 6.

The tubes were incubated for three hours at 39° C.; then their contents were titrated for sugar, with the following result:

Tube No. 1: 142 mgms. maltose.

Tube No. 2: 157 mgms. maltose.

Tube No. 3: 143 mgms. maltose.

The result of these tests showed a good amylolytic fermentation after salol had been given in large medicinal doses.

Experiment No. XV.

Into each one of three flasks one gramme of egg-albumen, dehydrated in alcohol and desiccated in the drying oven below 100° C., was placed, then 70 Cc. of water was added; then to flask No. 1, 5 Cc. of N/10 sol. HCl, to flask No. 2, 5 Cc. of N/10 sol. NaHO, and flask No. 3 was simply kept neutral. Each one of the flasks received 5 Cc. of glycerin extract No. 6 and the contents were made up to 100 Cc. They were kept in the incubator at 40° C. for forty-eight hours.

The examination of the contents of the flasks showed very little proteolytic action upon the egg-albumen, as may be seen from the following table:

Filtrate tested.	Acid solution.	Alkaline solution.	Neutral solution.
Millon's reagent.	Faint reaction.	Faint reaction.	Faint reaction.
Effect of neutralization.	No change.	No change.	No change.
Subsequent acidifying with acetic acid and boiling.	Slight flocculent precipitate.	Slight flocculent precipitate.	Faint flocculent precipitate.
Addition of 1.5 vol. of sulphate ammonium solution.	Little change.	Little change.	Little change.
Complete saturation with sulph. ammonium.	Little change.	Little change.	Little change.

In other words, there had been very little proteolytic fermentation. The formation of coagulable albumens and albumoses had perhaps been a little more pronounced in the alkaline solution, so the trace of trypsin present was probably larger than the trace of pepsin present.

On June 13, 1907, a specimen of intestinal contents was again received. It had been collected during or after the administration of aspirin. The specimen was divided into two equal portions. One portion was used to make the glycerin extract No. 7. The other portion was first extracted with alcohol, then with water. The filtrates were collected and tested for aspirin. The tests were negative. A small portion of the

mass received had been reserved for microscopic examination. Different vegetable cells and fibers were found, also much undigested meat, but no starch. The glycerin extract was tested for its amylolytic and proteolytic power.

Experiment No. XVI.

To each one of three tubes containing 10 Cc. of a 4-per-cent starch paste, 9 Cc. of H_2O and 1 Cc. of glycerin extract No. 7 were added. The tubes, as usual, were kept in the incubator (40° C.) for three hours. They then contained maltose as follows:

Tube 1: 172 mgms. maltose.

Tube 2: 173 mgms. maltose.

Tube 3: 173 mgms. maltose.

The result of this experiment shows that glycerin extract No. 7 obtained after the administration of aspirin contained a very active amylolytic ferment.

Experiment No. XVII.

This experiment was made to ascertain whether glycerin extract No. 7 contained an active tryptic or peptic ferment. Into each of three flasks 1 gramme of egg-albumen was placed. One flask received 5 Cc. N/10 NaHO, one flask 5 Cc. N/10 sol. HCl; each flask received 5 Cc. glycerin extract No. 7, the contents were made up to 100 Cc., and the flasks were then kept in the incubator at 40° C. for forty-eight hours.

	Flask contents, NaHO.	Flask contents, HCl.	Flask contents, H_2O only.
Filtrate.	Cloudy.	Clear.	Faintly cloudy.
Test with Millon's reagent.	Positive.	Negative.	Very faint reaction.
Addition of 1½ vol. sat. sol. ammon. sulphate.	Slight flocculent precipitate.	Faintly cloudy.	Faintly cloudy.
Complete saturation with ammonium sulphate.	Negative.	Precipitate.	Increase in cloudiness.
Neutralization subsequent acidulation with acetic acid.	Negative.	Negative.	Negative.
Test for peptone.	Negative.	Positive.	Negative.

The tests showed in the flasks with the alkaline contents the presence of all of the fermentation products.

The result of this experiment showed that extract No. 7 contained a tryptic ferment acting quite well in an alkaline solution, very faintly in a neutral solution, and practically not at all in the acid solution.

EXPERIMENTS AFTER THE ADMINISTRATION OF ASPIRIN.

On June 20, at 11 A.M., two bags were received, one marked "Specimen June 20, 6 A.M." It contained about six to eight ounces of a rather dry, yellowish, greenish mash, which had no disagreeable odor. The microscopic examination of the mash showed some undigested, unchanged starch. A watery extract of the mash, filtered, gave no reaction for amylo- or erythro-dextrin, but a faint sugar reaction. A watery and an alcoholic extract of the above mash were both tested for aspirin with entirely negative results.

The following test had been devised for aspirin, and it had been found as delicate as the test for salicylic acid or salicylate of sodium. The test can be applied directly to a watery extract; an alcoholic extract has to be first diluted with water, and the alcohol, etc., chased away by prolonged boiling.

The watery solution containing aspirin is first strongly alkalinized with a 10-per-cent solution of NaHO and boiled. Thereupon probably acetate of sodium and salicylate of sodium is formed. The next steps are the same as in the test for salicylate of sodium, namely, neutralization and slight acidulation with H_2SO_4, and finally addition of dilute solution of ferric chloride, whereupon if aspirin has been present a violet color is shown.

The second bag received on June 20 was marked "June 19, 7 P.M." The contents of this bag were almost perfectly fluid, strongly alkaline to litmus, but acid to phenolphthalein.

Glycerin extracts were prepared in the usual manner: that from the contents obtained June 19 was designated as glycerin extract No. 8; that from the contents obtained June 20 was designated as glycerin extract No. 9.

Experiment No. XX.

To each one of three test-tubes containing 10 Cc. of a 4-per-cent starch paste + 9 Cc. H_2O, 1 Cc. of extract No. 8 was added. The amylolytic fermentation was kept up for five hours at 40° C. Result:

Tube No. 1: 175 mgms. maltose formed.

Tube No. 2: 181 mgms. maltose formed.

Tube No. 3: 184 mgms. maltose formed.

Experiment No. XXI.

The same experiment with 1 Cc. of extract No. 9. Result:

Tube No. 1: 151 mgms. maltose formed.

Tube No. 2: 150 mgms. maltose formed.

Tube No. 3: 133 mgms. maltose formed.

Hence it is shown that extract No. 8 was superior to extract No. 9 in amylolytic fermentative power.

Tests to demonstrate the presence of lipase in extracts No. 8 and No. 9 were negative.

Tests to demonstrate the hydrolytic tryptic ferment showed a rather weak action.

Some tryptic ferment was present, but not very much of it.

Experiment No. XXII.

July 13, 1907, the different glycerin extracts then still on hand were tested comparatively as to the amylolytic ferment. To each test-tube containing 10 Cc. of a 4-per-cent starch paste 9 Cc. H_2O was added, and to the various tubes 1 Cc. of extract of the different extracts. The amounts of maltose formed after a fermentation of three hours at 38° C. were:

Extract No. 3 formed 165 mgms. maltose.

Extract No. 4 formed 87 mgms. maltose.

Extract No. 5 formed 178 mgms. maltose.

Extract No. 6 formed 181 mgms. maltose.

Extract No. 7 formed 165 mgms. maltose.

Extract No. 8 formed 128 mgms. maltose.

Extract No. 9 formed 159 mgms. maltose.

On July 20, 1907, the different extracts on hand were tested as to the tryptic ferment present. However, it was found that the tryptic ferment had become much weakened by this time, and in all of the experiments faint traces only of alkaline albumen, coagulable albumen, dentero-albumoses, and peptone were found.

34 WASHINGTON STREET.

HOLD FAST TO THAT WHICH IS GOOD IN DIAGNOSIS AND THERAPEUTICS.[1]

BY H. A. HARE, M.D.,

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When called upon to deliver an address under such circumstances as these the question naturally arises as to whether it is best to deal with some topic which bears upon our profession in the abstract, attempting to lead one's hearers from their customary haunts at the bedside, or to speak of things which more directly concern them in their daily life. I have decided to follow the latter course because it has occurred to me that if our hearts be in our work, as they should be, no other theme can prove so interesting, and because it may profit us both to compare our methods of thought and practice, and so prepare ourselves the better for the pursuit of a profession in which it is essential that we combine with an adequate commercial instinct the higher endeavor of doing good to those who are in that most desperate of all conditions, the condition of inability to help themselves.

It must not be thought from the somewhat Scriptural character of the title of my address that I am about to present you with a homily upon religious themes. My idea is to bring forward certain things which we are perhaps prone to ignore in our ceaseless endeavor to gain better ones, and so, often lose sight of old friends of real worth in the modern craze for something new. The spirit of the time is that of novelty, and this spirit is properly credited with most of the advances which have done so much to develop the science and art of our profession, for the spirit of novelty is perhaps the mother of advance in that it engenders the

[1] An address delivered before the Maine State Medical Society, June, 1908.

restless state of mind which makes one discontented with what he knows or has, and urges him to learn more, and to possess better things. The spirit of novelty is, however, a spirit which produces good results, so far as new discoveries are concerned, only in those who are possessed of the genius of original investigation, and it will do best in that class when it is controlled by sane thought or well-regulated processes of cerebration. Results produced by research are always glittering in appearance, at least when they first appear, and time and trial alone serve to determine whether they are made of tinware, or of some precious metal which retains its glitter through the stress of time and actual use without becoming tarnished and useless. So bright is the gaudy glitter of all new things that men, as well as children, are often captivated by them and take them for precious metal, only to find that they have given the value of gold to burnished brass. In other words, the function of the medical man to-day is to be continually on the *qui vive* for new things, and having found them, to regard them with the caution of a conservative, but with none of his dilatory characteristics. This is the more important in our guild because the testing of a new and glittering discovery is not made upon ourselves but of necessity upon those who, by misfortune, have been forced to place their lives and happiness in our hands. To expose these persons to results of an undue faith in new goods is an error as costly as to fail to give them the benefit of the latest real advance, and to substitute a new and untried plan or method for that which has been well tested and universally recognized is also an act capable of being seriously questioned. It is because of this need for governing the spirit of novelty by the spirit of judgment that I have chosen as the title of my address "Hold Fast to That Which is Good." Our state of mind should be gravely judicial. It was said of a celebrated American statesman that in youth he had the judgment of age and in age the enthusiasm of youth. It should be said of us that at the bedside we have the keenness of original research tempered by the judgment dependent upon analytical thought.

During the last hundred years the medical profession has passed through moods which closely resemble the moods of an individual—at one time optimistic, at another pessimistic; at one time ladling out potions with undue generosity, at another time withholding all medicines on the ground that they do nothing but harm; but on certain occasions exercising common sense, recognizing that some conditions were incurable by drugs, and also fully appreciating that many remedies, if properly administered, were capable of producing much good. In the earlier part of the past century much of the pessimism in regard to the administration of drugs arose from the fact that there did not exist any adequate conception of the physiological or pathological processes which were present in the patient's body, and also because, in not a few instances, the doses which were given were so heroic as to be quite capable of producing a condition which was worse than the disease. Later, with the advances which took place in physiology, pathology, and bacteriology, the seemingly utter hopelessness of attempting to combat perverted and diseased functions staggered the practitioner and drove him into a condition in which he was prone to consider that any struggle against disease was almost hopeless. At times this pessimism has, however, been swept aside by the further discovery that many of the remedial measures which have been employed with success in the past, upon a purely empirical basis, have in reality sound scientific standing.

One of the reasons why remedies fail to give the desired results lies in the fact that many physicians when examining a patient only seek for one cause of his illness, and having found this are entirely satisfied with their diagnosis, wholly neglecting the fact that the symptoms presented may be due to more than one cause. Thus, in a case which recently occurred in Philadelphia, a married woman was admitted to a hospital during the third week of typhoid fever in a condition of collapse, and was supposed to be

suffering from either perforation or hemorrhage from an intestinal ulcer. Abdominal section was performed, and to the amazement of the operator a ruptured extra-uterine pregnancy was found to be the cause of the condition of the collapse, a condition which would have been thought of first had it not been that the patient had been ill for some time with enteric fever.

The idea that uric acid is responsible for a host of morbid states was promulgated some twenty years ago, and having been accepted by physicians with an enthusiasm entirely justifiable, has reached the laity, who are now prone to regard every ailment as being due to this cause, when, as it is well known, uric acid itself is a normal product in the body, and even when injected into the blood in considerable quantities is incapable of producing any deleterious effects or grave symptoms. Finding that lithia, when mixed with uric acid, formed a soluble urate of lithia, the conclusion was at once jumped at that lithia would be a useful thing in the so-called "uric acid diathesis" to aid in the elimination of this substance, when as a matter of fact the action of lithia in the body is quite different from that which marks it in the test-tube, since it has a greater predilection for the acid sodium phosphate of the blood, which fluid it may damage by taking out this important ingredient. Again, lithia has been freely administered whenever the physician found an excess of uric acid and urates in the urine, when as a matter of fact this excess in the urine showed that the patient was getting rid of an excess of uric acid. As has been pointed out repeatedly, if lithia is ever needed for uric acid, it should be given to those patients who are passing too little and not too much of this substance.

After lithia had had its vogue a rival was introduced in the shape of the more expensive product known as piperazine, which was stated to be twelve times as powerful as lithia in dissolving uric acid. Later still, lycetol appeared as a rival of piperazine, and both of these substances were for a time popular until they had been weighed in the balance. Since then a series of other uric acid solvents have been introduced, but they are aimed at a fetish.

It is, however, true that the desire for something novel has given us extraordinary advances in therapeutics. All the new synthetic drugs have appeared, and although many of them have been clad in gaudy garb, comparatively few have remained as well clothed when they have stood the strain of trial. Indeed, one of the most remarkable things in connection with the career of those which still remain to us is that they are now chiefly employed not for the purpose for which they were introduced, but for other purposes, as, for example, the coal-tar antipyretics, now given chiefly for the relief of pain; salicylic acid, introduced as synthetic quinine, now used as a specific in acute rheumatism; and chloral, devised by Liebreich as an anesthetic, which is used only as a hypnotic.

On the other hand, a number of instances in which old remedies still seem the best, either in the lines in which they have been used for years or in new lines, may be cited. One of the most important of these is the use of magnesium sulphate as a local anesthetic and antiphlogistic. It used to be thought that we possessed a number of drugs capable of acting as antiphlogistics, but the bacteriology of modern days has proved that local inflammations have a more complex nature than mere local hyperemia, and so antiphlogistics have been almost discarded. In magnesium sulphate, however, my former pupil, Dr. Tucker, of Philadelphia, has brought forward an old friend in a new dress. He has shown that a saturated solution of this old-fashioned remedy applied on compresses in erysipelas, orchitis, and a number of other acute inflammations causes the most extraordinarily beneficial results, and this in the face of the fact that erysipelas is usually met with in persons whose vital resistance has been impaired by some general malady like nephritis, diabetes, cirrhosis of the liver, or cardiovascular disease. Further, its use over painful areas is often most satisfactory in relieving pain. I have even controlled the severe pain of the extremities in locomotor ataxia

by binding it around the limb above the pain area.

Another ancient remedy used, in my opinion, far too little is the oil of cloves in the treatment of excessive cough and expectoration in pulmonary tuberculosis and bronchiectasis. Five to ten minims given hypodermically in sterile olive oil once or twice a day produces, in many instances, excellent results. The injection is painful for a brief space of time until the local anesthetic effect of the drug is exercised, but the relief obtained by the patient compensates for it so largely that the treatment is not objected to.

Another drug originally brought before the profession for a very different purpose has also proved, within the last few years, to be the sovereign remedy in the treatment of burns of every degree, namely, picric acid. Some of you may be familiar with the series of papers which appeared in the THERAPEUTIC GAZETTE a year ago in which this subject was carefully discussed, and also you doubtless recall the experience of the surgeons of the United States Navy who were called upon to treat the men who were burned at the time of the explosion on the U. S. S. *Bennington*. A one-per-cent solution of picric acid applied on gauze and covered with paraffin paper, cotton pad, and a bandage produced results which no other method approached. Similar results were obtained by the Japanese surgeons during the Russo-Japanese war. Kindleberger of the Navy thinks that picric acid has a right to stand with antitoxin in diphtheria, mercury in syphilis, and quinine in malaria because of the excellent results which it produces.

How often do we turn to new remedies which are supposed to relieve renal and cardiac dropsy when adherence to the well-tried but ancient infusion of juniper berries and cream of tartar will be more productive of good results at much less cost. Another instance of the fact that an old-fashioned remedy should not be given up too readily for a new one is to be found in the effects of local applications of nitrate of silver as compared to those produced by some of the new silver salts. Derby, in Boston, de Schweinitz in Philadelphia, and others have proved pretty conclusively that many of these silver salts are almost valueless as such, and that for true activity nitrate of silver is much to be preferred.

Are there any newer methods of treatment which have a firm basis formed by scientific research? I think there are. One of these is the treatment of hemoptysis by cardiovascular sedatives rather than by cardiac stimulants and vasoconstrictors, as, for example, the use of inhalations of nitrite of amyl to draw blood away from the bleeding point into the other vessels of the body, and the use of chloral and aconite both for this purpose and to produce quiet. I advocated the latter method of treatment in an address which I delivered before the Lehigh Valley Medical Association fifteen years ago.

Another practical application of a drug, both as a prophylactic and remedial agent, is the employment of urotropin or uritone in typhoid fever to prevent infections of the urinary bladder and gall-bladder, and to prevent the spread of the disease by destroying the bacillus of Eberth, so that it cannot be distributed by the patient. The researches of Crowe within the last few months have proved conclusively that the use of this drug results in the excretion by the mucous membrane of the gall-bladder of formaldehyde, and as this has a specific influence on the bacillus of Eberth, this viscus need no longer remain a hot-bed of future infection.

Still another comparatively little used, but nevertheless valuable, application of an old remedy is the employment of chloral in fairly large doses in scarlet fever throughout the course of the disease as a nervous sedative and urinary antiseptic.

Finally, let me take up for consideration a therapeutic point which from the standpoint of medicine and economics has for many years been fought over in your State, namely, the value of alcohol. Some years ago I think I proved pretty conclusively that administered in disease it could, under certain circumstances, materially aid the patient in combating infection.

The subject is one which is continually before the profession and the laity, and is often clouded by a failure to recognize the fact that a vast difference exists between the system of the human being in health and in disease. *Harper's Weekly* has within the last year discussed this matter in a very sane way. With the moral aspect of the question we, as physicians, have little to do when we are at the bedside of the patient, provided it is known that he is not addicted to this drug, and provided we take the precaution to prevent the alcohol habit being induced by its administration in the presence of disease.

There can be no doubt that Emerson was right when he stated that "the reason why artists, poets, and musicians love wine" and other narcotics is because they "add to their normal powers" and "transmute life's leaden metal into gold;" and again, that "it helps a man to escape the custody of that body in which he is pent up, and that jail-yard of individual relations in which he is enclosed."

There can be no doubt whatever that alcohol as a therapeutic agent has been greatly abused in the past, and that many cases of chronic alcoholism have developed from its use as a medicament, but these are not reasons why physicians should refuse to employ it properly and cautiously in certain cases in which clinical experience shows that it is really indicated. I am of the opinion that, even if we bear in mind its evil influences and the possibility of the development of a habit, physicians are deliberately failing to recognize a remedial agent of considerable value if with one stroke of the hand they remove it from their materia medica list.

Harper's Weekly, recognizing the everlasting condemnation which is heaped upon alcohol and the equally everlasting persistence in its use by the greater portion of the human race, quotes from a series of contributions made to the London *Lancet* in which it is asserted that alcohol is a trustworthy restorative, and that as an article of diet the moderate use of alcoholic beverages is for adults usually beneficial. This opinion also seems to have found support by the investigations of the *New York Evening Post,* the editor of which submitted these statements to medical practitioners in New York, who, it seems to us, "hit the nail on the head" when they stated that alcohol in limited quantities is good for some people but not for others. As *Harper's Weekly* remarks, "most intelligent observers have noticed this fact for themselves." It is therefore evident that both doctors and laity regard the use of alcohol as something which is to be feared, and used with watchfulness and caution. *Harper's* further states that the idea that alcohol is "good for you" is pretty well exploded among people of common sense, but that the idea that it is invariably "bad for you," no matter who you are or how old, does not win its way either in theory or practice. In other words, to quote again from this same periodical, "whether it is good or bad, helpful or hurtful, depends on who you are, what age, what temperament, how employed, how fed, and also on what you drink and when and how you drink it." These remarks are essentially sane, and while they are made in connection with the question of the employment of alcohol by the well, they apply with equal force to the use of this drug in those who are ill.

The present day holds promise of progress in medicine which even the most advanced of us cannot describe. It has been one of the blessings of life that we have many remedies whose action we cannot explain because science has not advanced far enough to discover the disease process they influence nor the manner in which they produce their effects. It is to be hoped that some of the energy expended upon new remedies will before long be devoted to making the use of old ones more rational. We have had a scientific explanation of the effect of quinine in malaria, and with the discovery of the cause of acute rheumatism and the treponema pallidum we may be on the verge of knowing how the salicylates cure rheumatism and mercury cures syphilis.

There can be no doubt that we are prone to neglect remedial measures other than

drugs, partly because the patient is unwilling to take the trouble and partly because we are also governed by the same influence. The vogues of Christian science and psychotherapy show us that much can be done for ailing humans by mental effects. More can be done by mental effects plus physical effects if we use hydrotherapy, electricity, exercise, and fresh air in a scientific way.

It is in the recognition of these facts that some of the members of our profession have earned the extraordinary success that they have achieved, and have cured where others have failed.

ON THE INDICATIONS AND CONTRAINDICATIONS FOR THE USE OF DIGITALIS.

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Although digitalis is a drug regarded with fear and suspicion by some, yet most of us, I think, will agree that employed judiciously in suitable cases of failing circulation, it generally acts most satisfactorily. It is a drug with a very limited action, yet within these limits its action is a powerful one, and may render most effectual assistance to the physician who employs it correctly. Eichhorst,[1] in a recent article, says that he uses digitalis with entire confidence, but only under one condition, and that is when from any cause there arises a weak condition of the muscles of the heart. No tonic, he adds, has yet been discovered that will strengthen the weak heart as quickly and surely as digitalis. Einhorn[2] also writes: "Digitalis belongs to the best and surest medicinal remedies we have, but how and when it should be used is the question of the day." As my contribution to the symposium on the Treatment of Heart Disease, it is my desire in this paper very briefly to emphasize the conditions under which digitalis may and may not be used.

Digitalis is a drug which has been most carefully studied by pharmacologists and its action definitely ascertained; it has the disadvantage of containing several active principles which under favoring conditions readily undergo chemical change and either become inert or acquire a new action. A reliable preparation of digitalis in therapeutic doses produces, first, a definite stimulation of the functional activity of the cardiac muscle; systole becomes more forcible —Gottlieb[3] says, more than threefold more forcible; secondly, a stimulation of vagus inhibition, owing to which the heart is slowed and diastole lengthened; and thirdly, a distinct increase in the peripheral resistance to be overcome by the heart, an increase due to a constriction of the arterioles, chiefly in the splanchnic area, but also to some extent in those of the peripheral circulation.

As a result of these actions the output of blood at each contraction is much increased; intracardiac tension, especially that of the left ventricle, is raised; blood-pressure in the arterial system generally is increased, and the whole circulation becomes more rapid. This increase of functional activity produced by digitalis is temporary in character, developing slowly and passing off slowly, but can with careful administration of the drug be maintained for a long period without any indication of reaction. Under its prolonged influence, however, permanent results may be noted in the general nutrition of the heart, due to an increase in the blood supply through the coronaries, to a lengthening of the period of diastolic rest, and to a heightening of the intraventricular tension. In this respect digitalis differs markedly from other drugs which tend to produce exhaustion of the stimulated tissue. This effect on the nutrition of the heart is well illustrated by the experiment of administering digitalis daily to a young animal for two or three months. It is then killed and its heart compared with controls from

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[1] Indikationen und Methodik der Digitalis Therapie: *Deutsche med. Wochenschrift*, 1905, vol. xxxi, p. 49.

[2] *Sammlung klinischer Vortrage, Innere Medicin*, p. 511E, Volkmann, 1903.

[3] Zür Theorie der Digitalis Wirkung Medizinische Klinik, 1906, vol. ii, p. 955.

animals of the same litter. The digitalis heart will be found to weigh heavier and show distinct signs of hypertrophy.

We have therefore in digitalis a drug with very definite therapeutic indications, which judiciously employed may often prove to be a veritable gift of the gods, increasing the functional activity and nutrition of the heart, but which improperly and unnecessarily used may do distinct harm.

Digitalis is particularly indicated in all conditions in which we have to deal with a weakening heart muscle. It has for long been regarded as of distinct value in strengthening a failing circulation due to overstrain on the musculature of the heart arising from defects in one or more of its valves, and associated with impaired nutrition or commencing degeneration in the muscle fibers. This condition is most frequently met with in mitral incompetence, but may also be observed in the later stages of all forms of valvular defect. Only with a failing heart muscle, however, is digitalis of service. During the early stages of aortic incompetence or of mitral stenosis the musculature seldom shows any signs of giving way. In these lesions the quick, feeble, or irregular pulse and increasing indications of venous stasis, so frequently met with in mitral incompetence, and which especially call for the assistance of digitalis, are rarely seen, and until they appear digitalis is, in my opinion, better withheld.

In all forms of heart strain, however, the physician should not content himself with the administration of any drug, but should also direct his efforts to relieving the overstrain on the heart and maintaining its nutrition. For the first, rest in bed is often desirable and not infrequently necessary; in every case physical and mentral strain must be moderated. To secure the second, attention must be given to insure proper oxygenation of the blood and the elimination from it, as far as practical, of toxic and catabolic products. If the hemoglobin content is defective hematinics should be administered.

Once compensation has been lost the physician must remember that time is required to effect its restoration. Patients are very apt to think that with the subsidence of unpleasant symptoms a cure has been effected, and much disappointment results when a too rapid return to the daily strain of life brings on a relapse of the old symptoms. Compensation, as complete as possible, should always be the aim of the physician, and can best be secured by prolonged rest combined with the judicious employment of digitalis. In suitable cases a still more perfect compensation may be obtained by the careful employment of graduated exercises. Commencing with passive movements of the limbs, followed afterward by active and finally resisted exercises, according to the Schott method, while the patient still maintains the recumbent posture, will slowly re-educate a heart to stand considerable strain.

In acute endocarditis especially, but also in acute myocarditis, the employment of digitalis is to be deprecated. In this condition absolute rest with low vascular tension is demanded; even regurgitation of the blood-stream is of value for the time being by lowering intraventricular pressure. All acute inflammatory symptoms must pass away completely before the administration of digitalis can be free from risk of harm. If stimulants to the general circulation at this time are demanded, strychnine, ammonia, camphor, and alcohol are to be preferred.

In cases with high arterial tension digitalis is at the first contraindicated; but in all these cases in course of time symptoms of heart failure will set in—sometimes suddenly, owing to acute overstrain; more frequently slowly, owing to defective nutrition and commencing degeneration. In both cases at this period benefit may be obtained from the careful use of digitalis or strophanthus. In these cases it is often advisable to administer at the same time one of the vasodilators or the iodides. A few years ago, under the delusion that high pressure was in all cases prohibitory to the use of digitalis, I employed only the vasodilators, or administered digitalis only in small doses and combined with full doses of the nitrites. I was surprised, however, to find that in many cases I had no results until I gradually raised the amount of my digitalis until full doses were reached and the

blood-pressure had gained its former level; only then did the edema disappear and the signs of stasis subside. Many trials have convinced me that in such patients digitalis is often demanded in fairly full doses to maintain blood-pressure at its high level, otherwise capillary circulation fails and venous stasis develops. High blood-pressure in certain individuals is a necessary compensation.

Digitalis is by many regarded as of questionable value in the acute infections. In these conditions its action on the heart muscle is counteracted by the pyrexia, by the depressing action of the toxins upon the heart muscle, and by the often associated vasomotor paresis affecting chiefly the vessels in the splanchnic area. My own experience leads me to believe that in many cases it can be employed with advantage, although the results obtained are often not very manifest. Caffeine and camphor appear to have a more definite action.

In neurotic conditions of the heart, in the various forms of arrhythmia, bradycardia, and tachycardia, digitalis is seldom if ever of service, and has no value and can only do harm in the treatment of all forms of heart block.

Occasionally in practice we meet with what has been termed essential cardiac inadequacy, in which the heart muscle appears to be congenitally weak. In these cases a prolonged employment of digitalis would appear to be indicated. Many physicians also regard the prolonged use of digitalis in moderate doses as of considerable value in cases of chronic heart debility due to malnutrition. I can see no objection to its employment provided digestion is not interfered with.

Digitalis is a drug which can be administered over long periods, and to which recourse can be had time and again without losing its effect, provided always that the nutrition of the heart is maintained. In many cases its action is greatly assisted by free purgation, by the use of one of the mercurials, and occasionally by venesection. In the presence of degeneration, whether fatty or fibrous, in the heart muscle its action fails.

A good, reliable preparation of the drug only should be employed; in my experience a fresh infusion from recently dried leaves of the English plant, or the freshly powdered drug, gives the best results.

LUXATION OF THE METATARSOPHALANGEAL JOINT.

Subbotitch (*Deutsche Zeitschrift für Chirurgie*, Band 92, Heft 4-6) reports a case of this rare affection. The patient was a man fifty years of age, who had stepped backward from a window a distance of five feet and landed upon the anterior part of the left foot. He at once felt a sharp pain in the foot, and was thenceforth unable to walk. The author saw the patient an hour after the accident, at which time no swelling was observable. The foot appeared much broadened and the internal cuneiform bone was quite prominent; also the fifth metatarsal bone was very prominent at its upper end. Efforts at reposition were futile.

The *x*-ray showed a lateral luxation of the lower bones of the tarsus outward with fracture of the second metatarsal bone. The patient was anesthetized, and repeated efforts made to reduce the bones without success. In a little while considerable swelling of the joint occurred. A cutting operation was not undertaken because the functional result could not be foretold. For a few days the foot was kept elevated and ice applied, after which massage and passive motion were begun. At the end of the second week the patient was allowed to walk, but this was at first painful. Various apparatus for support were given to the patient, but he could not be induced to continue their use as he was more comfortable in the ordinary laced shoe. The foot remained absolutely flexible; there was not a trace of stiffness in the joint. It gradually grew better, and a year later the patient could walk on the floor without any support and without the slightest limp. Walking on rough surfaces caused pain, but this also soon improved. The foot gradually lost its arching and became quite flat. After three years the patient had so little difficulty that the author was of the opinion that he could not have been better if operation had been done.

EDITORIAL.

ANALGESIA VERSUS ANESTHESIA IN OBSTETRICS.

Our attention has been called to an interesting article on this subject contributed by Dr. Sir William Sinclair, Professor of Obstetrics and Gynecology in Victoria University, Manchester, England, to the London *Lancet* of May 30, 1908. As he well points out, the prevention, or relief, of pain has been one of the chief aims of medicine and surgery through all the generations of men, and again he states that nothing has stimulated the intellectual faculties of the medical profession toward this end more than the contemplation of the physical sufferings of women. After some further preliminary considerations Sir William proceeds to discuss the various methods which have been employed within recent years in obstetrics and gynecology for the relief of pain. In the first place, he advocates the use of morphine given in the dose of ¼ grain hypodermically toward the end of the stage of dilatation or during the process of expulsion, stating that it produces next to no effect upon the regular process of labor, and that it does not diminish the frequency nor the duration nor the force of the pains, and that usually within six minutes after the injection the sufferings of the patient are materially dulled or diminished.

We note with particular interest what Sir William has to say in regard to spinal anesthesia. He has gone over the literature of this subject quite thoroughly with particular reference to a number of German contributions to medical literature which have strongly advocated the use of the various local anesthetics by intraspinal injection. We have not room to quote this literature, but we are interested to note that he himself, as the result of what he has read and observed, comes to the conclusion that the effects of spinal anesthesia on the process of normal labor are simply disastrous. He thinks, however, that it finds its best application in the severer operations, such as Cæsarian section, and that it may serve a useful purpose in some painful gynecological operations. Taking into consideration, however, the points for and against this method of relieving pain, he concludes that the technical difficulties and by-effects of the drugs so administered are such that it is safe to predict that there is no call for lumbar anesthesia in the private surgical and obstetric work of the medical practitioner in Great Britain, or in any other country.

Concerning the combined use of morphine and scopolamine, he finds that notwithstanding all that has been said in favor of this method, it may be considered a fact that it should receive its final condemnation as too dangerous both for mother and child, and unsatisfactory in most other respects. He quotes the conclusions which were reached by Voight, and also those of Gminder of Erlangen. Out of 100 cases observed by this last clinician, in only 58 was the action of the drug considered satisfactory. In 27 the process of anesthesia was interfered with to an important extent. In four cases complications appeared affecting the mother, and postpartum hemorrhage resulted in five cases owing to atony of the uterus. Furthermore, entirely owing to the narcotic, 11 children showed severe and 12 children slight signs of asphyxia, so that Hocheisen agrees with Sinclair that the danger and unreliability of this method prohibits its introduction as an analgesic in normal labor. Furthermore, many deaths have been reported, according to the statements in this paper. Some of the minor disadvantages consisted in prolongation of the intervals of the pains, loss of power in the individual contractions, and nausea and vomiting. Bardeleben agrees with Sinclair in considering that there need not be any further discussion as to the advisability of this plan.

On the other hand, Sinclair speaks with considerable enthusiasm of the employment

of morphine, alcohol, and cocaine for the relief of lumbar pain. He admits that he has not had a very large experience with the use of morphine and alcohol, but of the combination of the three drugs named he can speak with entire confidence, and, furthermore, he does not think that there is any material danger of developing the alcohol habit in patients by its use. Under the influence of these three drugs he states that the patient is so benumbed on the one hand that she does not suffer materially, and yet on the other hand is completely under the control of the obstetrician or surgeon. The cocaine is used only locally to the parts which are to be subjected to the knife or other trauma, but the morphine and alcohol are taken by the mouth. The exact plan he follows in cases of labor and in cases of dilatation of cervical stenosis is as follows:

Three-quarters of an hour before the time fixed for the operation the patient gets a full dose of morphine hypodermically—¼ grain more or less. A quarter of an hour, or twenty minutes, before the time, she receives a soothing draught consisting of 2 or 3 fluidounces of whisky or brandy, which, if desired, may be masked by some vehicle and diluted. A favorite disguise for the alcoholic potion with him is a little fluid extract of licorice. As the result of this somewhat heroic method of treatment Sir William declares that at the appointed time the most timid patient becomes apathetic, and that any obstetric or gynecological procedure can be carried out with the help of a nurse and without the need of a skilled anesthetist. If a gynecological operation upon the genital tract is to be performed, the parts are exposed and thoroughly swabbed with a solution of cocaine, eucaine, or novocaine, and afterward cleansed with 1-to-2000 bichloride solution.

THE TREATMENT OF ALBUMINURIA.

Twenty-five years ago the discovery of the presence of albuminuria in the urine was considered as being a definite manifestation of distinct renal disease. It is now universally recognized as having no such specific indication, and as often appearing when the kidney is functionally disordered and not actually the seat of a pathological change. In other words, functional albuminuria is a well-recognized clinical condition. That the ingestion of excessive quantities of albumin can provoke albuminuria is questioned, although there are some experiments on record which would seem to indicate that the swallowing of a large number of eggs may produce a temporary leakage of albumin through the kidney. As a matter of fact, however, the majority of cases of albuminuria which are not associated with the presence of casts are functional. These instances are most frequently met with in early manhood or about the time of puberty; and Brown, in the *Clinical Journal* of January 22, 1908, states that Dukes, who has had extraordinary opportunity for studying this question amongst the pupils of the Rugby School in England, has found that 16 per cent of all the boys entering this school at the ages of thirteen or fourteen show albuminuria at times, and if under considerable nervous strain are very prone to develop this condition. As Brown states, these cases are usually anemic, "weedy youths," with a dull, heavy aspect and a tendency to fainting, and who have irritable hearts, the first sound of which is often feeble in character. This same class of cases not infrequently have periods of arterial spasm alternated with vascular relaxation, the arterial spasm developing under comparatively slight causes of nervous excitation. In some the albuminuria is associated with cold, clammy, congested extremities and a large, feeble easily compressed pulse, indicating lack of arterial tone. Severe exercise or cold bathing may in these cases be provocative of albuminuria.

It will be remembered that Wright some time ago called attention to the fact that albuminuria of a functional character may also be present in patients who manifest a lack of coagulability in the blood, and advised the use of calcium lactate for this condition. Indeed, Wright suggested, it will be recalled, that the internal use of calcium lactate might be employed for the purpose of making a differential diagnosis of albu-

minuria due to a renal lesion from the albuminuria of a purely functional nature, and Fox is quoted by Brown as having employed this treatment in seven cases, in all of which the albuminuria ceased, whereas in nine cases which were thought to be due to organic disease the use of calcium lactate failed to produce good results. Then, too, in some instances an excessive quantity of oxalates in passing thorugh the kidney may cause renal irritation and so produce albuminuria, and this condition can be avoided by forbidding strawberries, rhubarb, tomatoes, pears, cabbage, and other foodstuffs which contain excessive oxalates, and by the internal use of nitrohydrochloric acid or benzoate of ammonium.

Readers of the THERAPEUTIC GAZETTE for the last few years will also recall that we have more than once pointed out in these pages that the old idea as to the evil effects of red meats, as compared with white meats, in cases of albuminuria and renal disease has been exploded, since there is nothing to prove that the red meats are more deleterious than the white, under these circumstances. Acting on this principle we have for a long time permitted patients under our care with albuminuria to have a greater quantity of meat than has usually been customary, and we have yet to see that its use in moderation has had any but an advantageous result. Taken in excess it may throw upon the kidneys the work of eliminating an excessive quantity of salts or organic matter which is inadvisable. But in moderation the use of meat tends to support the system, to make up for excessive waste, and to maintain health, and furthermore the patient is not fretted by having to avoid foodstuffs to which he has been accustomed all his life. Brown advances the view that the custom of restricting all forms of proteid in functional albuminuria and in nephritis has received far too much attention, and agrees with us that moderation in the use of proteid food is usually much better than its exclusion from the diet list for the reasons we have already given. The only thing to be borne in mind is that an excess of nitrogenous food should not be administered, but a happy medium maintained by which too great a strain is not thrown upon the kidneys, and yet at the same time nutrition is preserved.

THE POSTURAL METHOD OF TREATING PULMONARY TUBERCULOSIS.

The best men in the profession have recognized for years that tuberculosis, above all other diseases, is essentially a condition that should receive no more medicine than is absolutely necessary for the purpose of combating symptoms, or conditions, which cannot be remedied by any other method. It has also long been recognized that in many cases of cavity in the lung, or of bronchiectasis, the patient can be saved much coughing if he is placed in such a position that the area which is chiefly diseased can be readily drained by gravity. Not infrequently placing a patient in this position morning and evening, and thereby enabling him to empty a cavity of accumulated secretion, will give him many hours of rest devoid of cough. It is therefore important to locate the physical signs in the lungs in order to advise the patient as to the attitude which is the best for him to maintain, either temporarily or for hours at a time. An interesting contribution to this subject has been made by Dr. Wise in the London *Lancet* of May 30. After speaking of the points which we emphasize, he illustrates what he has to say by pictures showing how a patient can be made to lie with comfort upon an inclined plane. The patient lies face downward upon a bamboo or wicker sofa which is elevated in the center six or eight inches above the ends. The feet are a little lower than the head, but the buttocks are considerably higher than the head. The result is that the bronchi readily drain into the larger bronchial tubes, and so on into the trachea, thereby very materially aiding the patient in bringing up from the lung the sputum which must be discharged. Of course, this attitude is the direct antithesis of the recumbent posture commonly maintained by patients who are bedridden. In some instances, for various reasons, this plan is not applicable, but when the sputum is copious and is brought up with some ef-

fort, we see much to commend in the method. Wise does not think that hemorrhagic cases are particularly suited to this plan, although we cannot see any marked contraindication to it. Another advantage of this method is that it produces a comforting sense of support to the chest, and tends to relieve pains in the lungs and in the chest walls.

PHOSPHATURIA: ITS SYMPTOMS AND ITS TREATMENT.

It was at one time thought that the presence of an excessive quantity of phosphates in the urine indicated a condition of nervous breakdown, and indeed it was considered as a direct evidence of the excessive nervous tissue waste. This idea has, however, been put aside. In the majority of instances the presence of phosphaturia is really an indication of lack of acidity of the urine, and it is particularly prone to develop in those cases in which an excessive secretion of hydrochloric acid in the gastric juice diminishes the acid in the body. As Brown well points out in the *Clinical Journal* of January 22, 1908, it is often advisable to determine the condition of the patient's gastric contents, since the relief of hyperchlorhydria will often indirectly relieve phosphaturia, and thereby decrease irritability of the bladder which may be due to the deposit of phosphates in this viscus. Then, too, phosphaturia is undoubtedly sometimes an evidence of marked tissue waste, and is often associated with neurasthenia and overwork, disappearing when rest or normal exercise after rest is taken.

For the relief of the irritable bladder produced by this cause we know of no remedy which exceeds in value urotropin or uritone, but in other instances full doses of benzoate of ammonium do equally well. The latter drug often seems to remedy not only the condition of the urine and so the condition of the bladder, but also exercises some influence upon metabolism, which relieves the cause of the phosphaturia in addition to producing an acidity of the urine which dissolves the phosphates. In some cases this drug may act as an intestinal antiseptic, and so directly prevent the causes of phosphaturia. As already indicated, too, the correction of abnormal gastric secretion is also advisable where this seems to be the cause. Brown states that phosphoric acid is also a very valuable remedy in these cases, whereas, on the other hand, if a fish diet is given, which is usually rich in phosphates, phosphaturia will probably be made worse. He also agrees with us that nitrohydrochloric acid is a valuable remedy in some instances. Whether this acid, under these circumstances, does good by hurrying digestion, or whether it does good by stimulating the liver, is not known.

POISONING BY LEAD.

It has long been a well-known fact that chronic poisoning by lead can develop under the most extraordinary conditions and from sources which are entirely unexpected. Crockery ware, hair tonics, and water-supplies have frequently caused it, and it will be recalled that a number of years ago a very large number of cases of chronic lead poisoning developed in Philadelphia as the result of bakers employing chrome yellow for the purpose of imparting a yellow hue to cakes which had heretofore been colored yellow by virtue of the egg which they contained. It is interesting to note in this connection that Dodd, a surgeon in the English army, calls attention in the *Journal of the Royal Army Medical Corps* for June, 1908, to the development of chronic lead poisoning in soldiers who used chrome yellow for cleaning their yellow braid and facings. This chrome yellow is mixed with water and freely applied to the braid, upon which it is allowed to dry, and then the surplus is removed by vigorous brushing. Under these circumstances Dodd met with a number of cases of mild lead poisoning which he attributed to the introduction into the system of the lead either by reason of its dust adhering to the fingers of the soldiers until they went to their meals, when it was readily transferred to the mouth with food, or because of the inhalation of the dust produced by brushing their clothes. He also calls attention to the fact that he has seen

very severe cases of chronic plumbism develop in soldiers engaged in removing red paint from canisters in which old ammunition had been returned from abroad.

VESICULOTOMY IN THE CURE OF GONORRHEAL RHEUMATISM.

Under this title Fuller (*New York Medical Journal*, May 30, 1908) contributes an article based on his experience of twenty-three patients suffering from gonorrheal rheumatism, all of whom have been profoundly benefited by this operation, and all of whom have left his hospitals either entirely well or in greatly improved condition. In all there was a seminal vesiculitis to account for the focus from which the systemic absorption originated. Seventeen of his cases were cured as the direct result of the operation, and were well when last seen. Of the remaining six, two got well after the operation and remained so until they contracted a fresh attack of gonorrhea, when rheumatic symptoms reappeared in a mild and transitory form. Two other patients on account of sexual excess during convalescence suffered from relapse, but ultimately convalesced entirely. Two other patients who had exhibited an extremely chronic condition relapsed, one after being well eight months, one after having been relieved three months. In both these cases—destitute individuals leading unhygienic lives—there was a recrudescence of tenderness and inflammation with the rheumatic relapse.

This contribution of Fuller's is of especial interest in relation to the enthusiasm recently manifested in regard to the use of the antigonococcic serum. To those who have followed the literature dealing with this latter remedy, it is apparent that its benefits yet remain to be proved. Of the many cases reported as cured because of the use of serum, it is obvious that a large number ran a course in no way different from that commonly observed under other forms of treatment. On theoretical grounds the serum treatment should prove efficacious, but the clinical evidence, though encouraging, has not yet become convincing.

Fuller's method of treating gonorrheal rheumatism is based on the undoubted fact that such rheumatism does not occur without a focus or foci of infection from which there is an absorption of toxins; by obliterating this focus the resultant disease will be cured. It is noteworthy that in a certain proportion of his cases the gonorrhea was of such long standing and the local symptoms were so slight that the possibility of the seminal vesicles being the source of the affection had not been seriously considered, these patients having received medical and orthopedic treatment, the latter usually to their detriment.

Fuller's uniform success is surprising, since, though doubtless, as he contends, the infecting focus is usually in the seminal vesicles, it lies in a certain proportion of cases in the follicles of the prostate. This is shown by the fact that in some chronic cases of rheumatism, when the seminal vesicles are neither tender nor swollen nor distorted by previous inflammation, a systematic treatment directed to the prostate alone will bring about a cure. He notes that in chronic cases, after vesiculotomy, pain disappears in a week or ten days. At the end of two weeks massage of the affected joints can be prescribed. In very chronic cases two or three months of massage and exercise may be required before the joints are properly limbered.

When it is remembered that certain forms of chronic gonorrheal rheumatism are attended by the maximum of pain, are followed by ultimate complete ankylosis, and respond not in the least to either medical or orthopedic treatment, manipulation usually making them worse as long as the toxins continue to be absorbed, it seems well worth while when such cases present themselves, after having searched in other parts of the body for the focus of infection, to at least examine carefully for chronic involvement of the seminal vesicles, and if this be found Fuller's proposition, by means of which the cause of the disease is attacked directly and abolished, seems not only more rational but, according to the report quoted, far more successful than any other form of treatment heretofore proposed.

SUDDEN DEATH FROM PLEURAL REFLEX.

It has become an established part of medical belief, based upon many corroborative published cases, that surgical intervention, when it concerns the pleura or lung, aside from the danger incident to entrance of air into the pleural cavity, of collapse, or of hemorrhage, may be followed either immediately or shortly after by sudden death which cannot be explained by autopsy findings. These cases of death have occurred from a procedure as trifling as the introduction of an aspiratory needle into the pleural cavity, or have followed more extensive intervention, the immediate traumatism of which the patient apparently sustained well. In particular they have been noted as sequent to sponging of the pleura or its irrigation, and have occurred in the course of a surgical dressing days or weeks after the original operation has been performed. There is little doubt but that some of these deaths can be attributed to pulmonary or cerebral embolism, in which case there should be no difficulty in corroborating the cause by autopsy. There remains, however, the large number to be accounted for in which there are no autopsy findings. The customary explanation of this unfortunate sequel of thoracic surgery is that the reflex is of vagal origin, cardiac inhibition occurring as the result of stimulation of the terminal nerves of the pleura or of the alveolar lung area.

Körte and Lenhartz note some form of collapse in 10 per cent of their cases of pulmonary surgery. Capps and Lewis (*Surgery, Gynecology, and Obstetrics,* August, 1908), as the result of a laboratory investigation, conclude that these sudden deaths incident to thoracic surgery are of either the cardioinhibitory or vasomotor type, or a combination of these two. Cardiac inhibition, a reflex of central origin, is characterized by slow pulse, marked fluctuations of pressure between systole and diastole, combined with slow respiration. The condition is usually transitory and recovery takes place. The vasomotor type, which may be either central or peripheral, is characterized by rapid, running pulse, without tension, by shallow respirations, and by death from vasomotor paresis. The authors quote Brodie and Russell to the effect that excitation of the pulmonary branches of the vagus produces the most marked reflex cardiac inhibition, similar irritation of neither the cardiac nor the lower fibers causing anything like the same effect. Indeed, there is a very close connection between the respiratory tract and the cardioinhibitory center, active stimulation of the nasal mucous membrane at once arresting the heart, as does almost in the same degree stimulation of the laryngeal mucous membrane or the nerves supplying the alveolar portions of the lungs. The nerves of the trachea and larger bronchi are much less sensitive.

The practical results to be derived from these laboratory studies are of considerable importance. In the cardioinhibitory type of collapse the use of atropine on theoretical grounds may be advisable. From this type, however, recovery usually takes place, the condition being a transitory one. In the vasomotor type atropine is certainly futile, and indeed Capps and Lewis consider that it may be distinctly hurtful. It is in this type that intravenous injection of adrenalin is particularly applicable, together with the means usually adopted for the raising of blood-pressure—*i.e.,* bandaging the extremities, lowering the head, intravenous injection of normal saline or even direct transfusion of blood, supplemented, of course, where the respiratory center is markedly affected, by artificial respiration. From the standpoint of prevention the avoidance of all possible traumatism is indicated, and particularly of such traumatism as is likely to affect the alveolar portion of the lung, as for instance that incident to the use of a trocar and cannula too long or penetrating more deeply than necessary, or of a drainage apparatus which rubs directly against the lung substance.

THYMUS DEATH.

In recent years there have been reported an increasing number of cases of sudden death, often occurring in the course of trifling operations, and usually in young

people, for which there was no adequate cause other than what is termed status lymphaticus, which is supposed to be connected with some abnormality of the thymus gland. In a number of these cases the thymus gland has been found distinctly enlarged and a condition termed laryngismus stridulus is present, in which death occurs rapidly in babies or children without forewarning, with suffocating symptoms. There is an almost universal belief to the effect that a fatal issue is due in such cases to the acute congestion of the thymus gland, which exerts mechanical pressure and occludes the larynx. Although it is true that the thymus gland corresponds in type with the lymphatic glands in general, there can be little doubt but that it has an internal secretion affecting metabolism. That it is not essential to life or growth is shown by the fact that it can be removed without causing death, but that it is accessory and has a distinct function which can be taken up by another gland is demonstrated by the fact that simultaneous extirpation of the thymus and the spleen always results fatally. That its function is exerted only during the period of active growth is apparently demonstrated by the fact that it atrophies with age and disappears about puberty. Its anatomical and physiological relation to the thyroid seems to be demonstrated, since it seems to be quite unnecessary to the economy when the thyroid is removed, and if it be removed itself less thyroid gland is required to carry on the proper metabolism of the system.

McLennan holds that the cause of death in both status lymphaticus and laryngismus stridulus is not mechanical pressure, but is incident to the alteration of the internal secretion, and notes that after goitre extirpation sudden thymus death has occurred, the thymus in these cases having been found enlarged at autopsy. These facts would seem to indicate that thymus extirpation, which in itself is not a difficult operation, unless it be complicated by impending death from suffocation, is likely to be more frequently practiced than has heretofore been the case.

REPORTS ON THERAPEUTIC PROGRESS.

NOTES ON THE JUNGLE PLANT (COMBRETUM SUNDIACUM).

SILKWORTH, in the *New York Medical Journal* of May 30, 1908, makes an interesting report in regard to this remedy. He believes the vast majority of those addicted to morphine would, beyond doubt, discontinue its use promptly were it not for the physical torture which would almost immediately supervene. They use the drug from necessity, not from desire. There are unfortunate cases in which neurasthenia or some peculiarity of constitution renders a permanent withdrawal of the drug almost impossible, and to this limited class may be attributed the origin of the term morphinomania, a morbid craving for morphine. In opium smoking, the pipe itself, the lamp, and associations are powerful factors in considering the possibilities of a permanent cure. There are many who, long after they have discontinued the drug, will continue to light each night the small lamp used in preparing the opium for smoking, so that after a few years' use of the drug these are the habits they crave possibly more than the opium itself. A more healthy and humane conception by physicians of drug addiction will do much toward eliminating the habit and will turn to legitimate channels the thousands of dollars which now fill the pockets of advertising frauds.

A party of Chinese wood-cutters were presumably the first to discover the properties of the drug which is now used extensively as a cure for the opium smoking habit in the Federated Malay States. The plant is a large climber, with a long, woody stem often reaching a height of one hundred or more feet. In the "Materials for a Flora of the Malayan Peninsula" it is described botanically by Lieutenant-Colonel Sir

George King, and is shown to belong to the order *Combretum sundiacum*. Sir George Wart, in a dictionary of the economic products of India, mentions two species of the genus as being used in native Indian medicine, but with no details as to their uses or properties.

In preparing the drug, the branches and leaves are chopped into pieces about one and a half inches in length; after drying the woody portions are separated from the leaves, and both the bark and the leaves roasted, the leaves to a less etxent than the bark. Upon completion of this process the two portions are mixed together again.

The infusion is prepared by taking, for example, ten ounces avoirdupois of the roasted drug and mixing with about four gallons of water. This solution is kept boiling for three hours, being loosely covered to prevent too rapid evaporation. The liquid is then strained and is ready for use. The author does not believe that a fixed rule for prescribing can be laid down, but in general the method of administration to an opium smoker would be as follows:

Whatever the daily amount of opium the person habitually smokes, that amount is to be mixed with the infusion. The average allowance would be from sixty to one hundred and twenty grains, although beyond doubt a considerable quantity of the alkaloids are not absorbed into the system of the smoker. If, for example, one hundred and twenty grains had been the daily allowance, then two twenty-five ounce bottles of the infusion A and B are used. Into A is put one hundred and twenty grains of burnt opium (that is, prepared the same as if for smoking). From the bottle A one and a half ounces is given to the patient and one and a half ounces from bottle B is put into bottle A. This is repeated each time a dose is taken, usually three times a day. Bottle A maintains its bulk, although continually decreasing in its opium contents until bottle B is exhausted. At the end of this course a second treatment is given, beginning with about one-third the initial amount of opium used, and upon completion of this the patient should be cured. With twenty-five ounces in the bottle and one and a half ounces at each dose, there would be about sixteen doses in each bottle. Each dose would represent a decrease of one-sixteenth of the total amount of opium left from each succeeding dose up to the seventeenth dose on the sixth day, or until bottle B is exhausted. There would then be no further change to the thirty-second dose, when the entire one hundred and twenty grains would have been taken and the contents of the two bottles exhausted.

The remedy, while not a panacea, seems to offer the best medium of reduction thus far given to the profession, and while the experiments of the author have been confined solely to the practical demonstration of the plant, he is led to believe that there may be present in the remedy an active ingredient, antiopium in its properties. The burnt opium in gradually decreasing doses certainly plays an important rôle in the treatment, but this alone, or in combination with any other form of medication heretofore known, has been, on the whole, unsatisfactory.

Both physician and patient must work together in harmony, and the suffering incident to the discontinuance of a powerful drug must be mitigated as much as possible, if permanent results are to be obtained.

THE TREATMENT OF GASTRIC ULCER.

In the *St. Paul Medical Journal* for June, 1908, GREENE sums up an article upon this topic as follows:

1. Medical and surgical statistics are alike faulty and misleading.

2. A deplorable amount of operative work has been done in purely medical cases.

3. In most instances neither before nor after operative interference has there been a proper scientific use of modern diagnostic or therapeutic procedures.

4. Simple ulcer is always medical. Chronic ulcer is only surgical when persistently recurrent. Cases of moderate stasis and pylorospasm are not primarily surgical. Hemorrhagic cases are seldom fatal and yield a lower mortality under medical than

under surgical treatment. Surgical relief is advisable in painful perigastric adhesions which are resistant to medical measures. Perforation is a purely surgical condition.

5. Proper medical treatment and after-control reduces recurrence to a minimum.

6. The absence of this control in public clinics permits and justifies a freer recourse to surgery than would be permissible in private practice.

7. In properly controlled private cases there is but a negative mortality.

8. The rigid plans of treatment and time divisions are an absurdity, and the practitioner should be governed by a knowledge of the fundamental principles involved, the clinical course, known conditions as to gastric secretion, and yet more as to mortality and the individuality of the patient.

9. Absolute rest, mental and physical, the wise employment of alkalies, proper nourishment, demanding little of motility and secretion, exciting a potent digestive fluid rather than a profuse one, easily assimilable and nutritious, and proper psychotherapeutic control comprise all measures usually found necessary.

10. Hospital care and the services of a trained nurse are of great importance.

11. Patients should be kept under direct observation and control for at least one year after apparent cure.

12. Results should be reported after five years.

13. Cure is not complete until all local tenderness, rigidity, and pain are relieved, blood absent from the stools, and the previous best weight of the patient regained. The requirements on the part of the surgeon should be quite as definite, and in both the claim to cure should be tested by a long immunity period.

THE USE AND ABUSE OF DIGITALIS.

In the course of an excellent article on this topic by JANEWAY in the *American Journal of the Medical Sciences* for June, 1908, he has this to say in regard to inefficient preparations. Few practitioners have the remotest idea how little good digitalis can be had. The majority prescribe a drug which, if good, may save life, without inquiry into its character or method of preparation, and often in a form which the least study would convince them must be inert. A surgeon who displayed similar carelessness as to the preparation of his ligatures and dressings would speedily be brought to his senses by a suit for malpractice. We medical men must face our responsibilities in this matter of dishonesty and incompetence in the drug trade, wholesale and retail, or reap the inevitable harvest of deserved loss of confidence and of our own self-respect.

The active principles of digitalis are glucosides, which decompose readily in the presence of moisture, yielding inert or toxic products. In order that we may be sure of giving efficient digiltalis, and not inactive or irritating digitalis decomposition products, the following conditions must be fulfilled: (1) The leaves must be from plants of the second year's growth, picked at the beginning of efflorescence, freed from stalks, and carefully dried. (2) The dried leaves must be kept absolutely dark and free from moisture in sealed tin or glass containers, and for not more than one year. (3) The preparation dispensed must be freshly made from these leaves in exact accordance with the method prescribed by the U. S. P.

This obviously requires intelligence and honesty of all concerned in each step of the process. A good physician, in the present state of our knowledge, should not concern himself overmuch with pure digitalis glucosides. He should learn from personal investigation which druggists can be trusted to keep good leaves, to keep them dry and dark, and to make a fresh preparation every time it is called for. In New York, the author states, he can count on a few apothecaries of this kind, and he invariably sends patients to them.

The worst digitalis preparation, the author asserts, is an infusion made by diluting the fluid extract, thus precipitating all of its active ingredients. This is a common practice. Another, of like kind, is an infusion made by diluting a so-called mother

liquor. This was once used in a hospital with which he was connected, and digitalis came into bad repute with the staff. Other inefficient forms are the many tablets or pills containing digitalis or digitalin. The only solid form in which digitalis should be given is the freshly powdered leaf in capsule or pill. The commercial digitalins are all impure mixtures, made, as a rule, from digitalis seeds, and should only be tolerated where very mild effects are desired over a long period of time.

The use of combinations of heart tonics, usually with nitroglycerin, now sold in tablet form, is one of the most deplorable developments in therapeutics to-day. The practitioner who allows himself to give powerful drugs in this way fails to learn the action of any one of them. If he thinks at all, he becomes a skeptic; otherwise he remains little more than the agent of some manufacturing pharmacist.

The fluid extract of digitalis is far too strong to permit of easy regulation of dosage. The writer does not favor its use, as he has never seen satisfactory results from it.

There remain two official preparations, the infusion and the tincture, besides the powdered leaves, which, under the conditions named above, may be considered trustworthy. The choice of one of these must be largely a personal matter. One should learn how to give a single preparation and regulate its dosage under various conditions. The author's experience leads him, for most purposes, to favor the infusion, chiefly because one can be reasonably sure of having it freshly made if so specified. In case after case supposed to have been treated with digitalis without benefit, he has seen prompt results follow its use.

THORACOSTOMY IN HEART DISEASE.

The *Lancet* of July 4, 1908, publishes an interesting paper by Dr. Alexander Morison, in which some observations are made concerning an operative method devised to afford relief to certain cases of enlarged heart. The enlarged area of pulsation and the forcible thrust against the chest wall in cases of greatly hypertrophied heart are familiar features in the clinical picture of certain forms of cardiac disease. Some years ago Dr. Morison suggested that the severing of pericardial adhesions by surgical methods might eventually be a practicable procedure, and again in a paper read before the Æsculapian Society, and published in the *Lancet* of July 28, 1906, he suggested that the hypertrophied heart needed more room to work in and that it was possible that in the future a means might be found to provide such increased room by surgical methods. He now gives references to the actual carrying out of operations specially devised for this purpose with which he has recently become acquainted. He finds that as long ago as 1902 Professor Brauer proposed that the costopericardial adhesions in cases of adhesive pericarditis should be separated, and operations were carried out upon two of his cases by Professor Petersen and Dr. Simon, pieces of several ribs being resected in the first case, while in the second case a portion of the sternum was also removed. A third case was operated upon by Dr. Simon, and Dr. Morison is privately informed that a fourth case has been operated upon under Professor Brauer's supervision. Professor Wenckebach has also published a case in which parts of several ribs and their cartilages were removed. Dr. William Mackenzie, of Melbourne, has independently suggested the removal of portions of the sternum and ribs in order to free the heart from costopericardial adhesions.

Still more recently Dr. Morison has developed the principle of affording relief to intrathoracic pressure by operative procedure by applying it to a case of cardiac pain associated with enlarged heart due to aortic valvular disease, with a view to afford increased room independently of any question of relief of tethering due to pericardial and costopericardial adhesions. The clinical features of the latter case are described in detail in his paper. The patient was a clerk, aged nineteen years, with aortic valvular disease associated with severe attacks of pain. After rest and medical treatment

had failed to give relief Mr. Ewen C. Stabb, at Dr. Morison's suggestion, performed on May 1 an operation, removing four and a half inches of the fifth rib and five and a half inches of the sixth. The results of the operation to date appear to have been satisfactory, and there has been considerable relief to the pain from which the patient suffered.

It is obvious that the greatly hypertrophied heart has to make room for itself in the closed thoracic cavity and the bulging of the precordium in children is an evidence of the force which it exerts upon the more easily yielding thorax in early life; consequently from a theoretical point of view the suggestion to afford increased room for the heart or to lessen the resistance which it has to contend against is one which has much to commend it. Practically, however, the procedure is a somewhat serious one to recommend to a patient with grave organic disease of the heart, involving as it does anesthesia with a more or less extensive operation. Dr. Morison himself deprecates laying too great stress upon the result in a single case. Moreover, the time which has elapsed since the operation is very short. The further progress of the case is awaited with interest, and meanwhile Dr. Morison and Mr. Stabb are to be congratulated upon the result so far obtained. One cannot but feel, however, that the cases submitted to this operation will require most careful selection, even should the permanent results prove as encouraging as those immediately obtained.

NATURE AND TREATMENT OF LEUKEMIA.

The *Medical Record* of July 11, 1908, deals with this interesting topic as follows:

The primary diseases of the blood constitute but a lately opened chapter of human pathology, yet they have formed a subject of such interest both to the research workers and to the practical clinicians that their symptomatology and the pathological changes occasioned by them in the human organism have received much special attention. The cause of them, however, has remained undiscovered, and the treatment has been very inefficient. It may be assumed that parasitic etiology is improbable, since the attempts of Mosler and Bollinger to infect susceptible animals by the leukemic blood were completely unsuccessful, and like experiments carried out by Schupfer with patients suffering from incurable carcinomatous disease could produce no leukemic changes.

Most interesting findings in regard to the pictures of the blood seen in leukemias have been lately published by Grüneberg (Medizinisch-naturwissenschaftliches Archiv, Vol. I). His examinations of embryos has shown that human embryonal blood answers completely to the picture of lymphatic leukemia, and even the increase of normoblastic red cells after the sixth month makes the blood quite comparable to the condition found at certain stages of the disease, when compensating processes seem to be most evident. The essence of the leukemias, therefore, is the return of the blood to its embryonal composition so far as its cellular elements are concerned. In an article in the *Berliner klinische Wochenschrift* of June 15, 1908, Grawitz indeed says that on many occasions the leukemia is nothing but the unlimited attempt at blood formation which has been called forth by some such cause as chronic inflammatory and suppurative conditions. Ziegler and Tochmann have published a case in which a simple neutrophile leucocytosis of 28,000 leucocytes called forth by a chronic staphylococcus infection changed to a leucocytosis of 240,000 cells, mostly myelocytic in character.

Grawitz reports the success he has had in the treatment of leukemias during the last three years—that is, since the *x*-rays have been utilized for this purpose. Ten of the twenty-six patients suffering from myelogenous leukemia recovered under treatment with the rays, the spleen diminishing to normal size and the blood assuming its usual picture. Three of the ten had relapses, but a second course of treatment again proved efficacious in curing them. Only one patient with lymphatic leukemia was cured of the disease, if freedom from the

signs of the affection for the period of two years constitutes a cure. In general, this type of the disease proved quite refractory to the *x*-ray therapy. However, up to the introduction of this treatment the outlook for all leukemic patients was very dark indeed. If one type of the disease even can be successfully controlled, it means that a great many victims may be annually saved. It seems probable, too, that early diagnosis and the improvement of the technique of treatment will increase the percentage of the cures.

SERUM DISEASE AS A CLINICAL MANIFESTATION OF ANAPHYLAXIS.

SAUNDERS contributes an interesting article on this topic to the *Interstate Medical Journal* for July, 1908. He states that very soon after the discovery and general use of antidiphtheric serum the profession became acquainted with a group of phenomena, following the hypodermic injection of normal, antitoxic, or bactericidal serum, to which the name "serum disease" is now applied. In general, these symptoms consisted of eruptions and joint pains occurring in a certain proportion of cases. Physicians regarded these symptoms as uncomfortable, though harmless, after-effects in susceptible individuals, and attributed the rashes to some toxic substance in the horse's blood-serum. This was a mistake. The symptoms observed were only a few of the phenomena which attend a very severe internal disturbance, due to the introduction of heterologous proteids in the circulation. Recent clinical and experimental investigations have revealed the fact that remarkable changes take place in the organism injected with the serum, so that the disturbance has been dignified by a special name—"Serum Disease."

Although manifest symptoms do not occur in more than one-third of all cases, the cellular reaction to the alien serum is probably present in every individual who receives an injection, and the phenomena of anaphylaxis may be observed to a greater or less degree, if the proper tests are made.

In some of the cases injected, varying from 10 to 40 per cent, after a period of five to twenty days, the patient becomes restless, and may complain of lassitude and pain in the limbs. This is soon followed by the serum exanthem, which is often accompanied by severe itching and burning. The serum rash varies in character. Most often erythematous patches, rose-red in color, will be found covering various parts of the body. Next in frequency are urticarial lesions. Sometimes the eruption is distinctly scarlatiniform; occasionally it resembles measles. The eruption may be polymorphous, wheals, erythematous patches, and macules being observed on various parts of the body at the same time. Occasionally a typical erythema multiforme, or erythema iris, with severe constitutional symptoms, occurs, especially after repeated injections of serum.

A very striking symptom is edema of the skin, which may be present only in certain circumscribed spots, or more rarely involve the whole integument, giving the person a ghastly, bloated appearance. A very serious form is the hemorrhagic type, in which hemorrhages occur in the skin. Fortunately this is rare.

The disturbance likewise is shown in the mucous membranes. Erythematous spots may occur on the hard and soft palate. The fungiform papillæ of the tongue may be swollen, and give the tongue a raspberry appearance.

A very remarkable symptom, to which the author drew attention about ten years ago, is dysmenorrhea in women. When a young woman receives a dose of diphtheria antitoxin within two weeks of her menstrual period she is very likely to suffer severe pain, and an increase of flow at the subsequent catamenia.

Joint pains are frequently observed. One or more of the joints may become very tender to touch and to movement. Muscular pains are very common. Articular swelling may be present. The wrists, knees, hips, elbows, ankles, and shoulders are most frequently implicated.

That the disease is a general disturbance is proven by the fact that an elevation of

temperature is frequently present. The fever may be very high. Vomiting and diarrhea occur in a small proportion of cases. In 1899, after repeated injections of diphtheria antitoxin in the babies of the Bethesda Foundlings' Home, the author had the opportunity to observe in several cases the sensitizing effect of a previous injection. He found that many of the infants who had received an immunizing dose six weeks previously showed a very marked supersensibility to the second injection. The symptoms of serum disease, which are usually delayed a week or more, came on within a few minutes, and with much greater violence. The author reported these observations in the *St. Louis Courier of Medicine*, 1899. Although the explanation given then does not entirely harmonize with the present debated theories, the occurrence of a supersensibility and the clinical symptoms were clearly depicted.

The condition of anaphylaxis is sometimes remarkably protracted. Thus, in one instance, in a little girl who received an injection of antidiphtheric serum four years previously, another injection of the so-called globulin antitoxin produced violent symptoms in a few hours. In experimental anaphylaxis, Rosenau and Anderson found the condition persisting for several months. It is possible that this supersensitiveness may remain throughout life in certain individuals, and that it may be transmitted to offspring, as is the case in guinea-pigs.

The symptoms of this second reaction are very similar to those of the primary disease, but supervene very soon after the second injection, sometimes within a few minutes. There may be chill, convulsions, and sudden high fever. The respiration becomes very rapid, the pulse accelerated, and the patient shows great anxiety. In some cases a severe dermatitis, with local pain around the site of the injection, appears. Bolton reported a case of local gangrene, a condition that frequently occurs in anaphylactic rabbits.

As far as the author has been able to observe, no cases of death have occurred in human beings by the repeated injections of horse serum, yet the severe symptoms which sometimes occur, and the fact that gangrene and death are so frequent in animals, convince the clinician that antitetanic horse serum is by no means a remedy which can be used carelessly or indiscriminately.

Another form of supersensitiveness occurs in certain individuals who have not had a previous injection of antitoxin. Quite a number of cases have been reported, and the author has observed a number himself, in which the immediate serum reaction occurred, and yet the patient injected had never before had a dose of horse serum. No explanation can be offered for these cases at present except that of idiosyncrasy.

Finally, another form of supersensitiveness is found in those rare instances in which sudden death occurs after an immunizing or curative dose of diphtheria antitoxin in those injected for the first time. Patients suffering with asthma, Graves's disease, and lymphatism are most apt to show this fatal supersensitiveness. Quite a number of cases have lately been reported. The symptoms in those fatal cases, in general, resemble those of animals made supersensitive to serum, and receiving a fatal dose. Severe dyspnea, rapid respiration, cyanosis, intense edema of the skin, are the prominent symptoms. The patients die from respiratory paralysis. There can be little doubt that the anaphylaxis in these patients is similar to that produced in animals, although we are entirely ignorant of the cause, and have, unfortunately, no way of recognizing its presence until after the serum injection.

An important condition often incident to the serum disease is that the general bacterial or antitoxic resistance of the body is lowered during the height of the anaphylactic stage. Several cases of diphtheria have been reported with relapses in this period. Cases have been observed of streptococcic infections, erysipelas, dysentery, and chorea which have improved under the serum injections, but rapidly become worse during the height of the serum disease. It may not be wise, therefore, to use an antitoxic or

bactericidal serum if its curative effect cannot be obtained before eight or ten days.

The following practical rules may be offered in the light of our present knowledge:

Curative sera are not the harmless substances we originally supposed.

Immunizing injections of serum should not be employed when isolation will prevent the disease with a reasonable degree of certainty and the children can be watched.

Serum should not be used in asthmatics, or those suffering from Graves's disease or the lymphatic constitution, except in developed diphtheria.

The use of bactericidal sera of doubtful value should not be encouraged, without careful consideration of all the possible bad effects from anaphylaxis.

If a second dose of serum must be given during the few weeks following a primary injection, small repeated doses are preferable to a large single dose.

On the other hand, one large initial dose is probably less harmful and far more effective than several small doses given over several days.

THE OPHTHALMO- AND THE CUTANEOUS DIAGNOSTIC REACTIONS IN TUBERCULOSIS.

In the *Albany Medical Annals* for July, 1908, LAIRD gives an excellent résumé of this subject. He calls attention to the fact that under the title "Die Ophthalmo- und Kutandiagnose der Tuberculose" Wolff-Eisner writes a volume of two hundred pages, making the first number for the year of Brauer's Beiträge zur Klinik der Tuberkulose (1908, ix, i).

It is a complete review of the new subject, less than a year old, of "local reaction" tuberculin tests and contains much original material. Over 500 articles have appeared since June, 1907, many of which have been reviewed by the author. He gives 245 references to articles on this and related subjects. The credit of originating the ophthalmo-tuberculin test has frequently been assigned to Calmette, but Wolff-Eisner demonstrates his own priority in suggesting its clinical use, and prefers the designation "conjunctival" to "ophthalmo-tuberculin" test, the term used by Calmette.

He recognizes the value of the subcutaneous tuberculin test, but thinks it is not entirely devoid of danger, besides producing severe general symptoms. The temperature must be carefully observed for some days before and after the test. The test cannot be readily given without certain apparatus for preparing dilutions, and its field has been somewhat limited. All these disadvantages are overcome or diminished in the new local reaction tests.

The technique of the tests, the results of clinical observation, and finally the theoretic consideration on which they are based, are discussed in turn.

Technique of the Cutaneous Test.—The skin is first rubbed with alcohol. The scarification need not be extensive and may be hardly more than a point. It may be made with any sharp instrument or with Pirquet's "Schaber." It is an advantage to have a platinum instrument, since it is so readily disinfected. There is, however, very little risk of infection. It is unnecessary to do more than reach the superficial lymph vessels, and it is an advantage not to draw blood. The scarification may be made through a drop of tuberculin previously placed on the skin, or the tuberculin may be applied after the scarification is made. A 25-per-cent solution of Koch's old tuberculin is used. Control vaccinations with sterile salt solution or with glycerin and carbolic acid solutions in the strength in which they are found in tuberculin (5 per cent, 0.1 per cent) should be made, as in certain individuals the skin is greatly irritated by the slightest traumatism. It is better to employ a separate lancet for the control test.

Technique of the Conjunctival Test.—The patient's head should be tipped well back and the under lid should be supported for half a minute with the finger after the diluted tuberculin is dropped in the eye. The eye should not be rubbed afterward. Wolff-Eisner uses a freshly prepared one-per-cent solution of Koch's old tuberculin

in 0.8 salt solution, and one drop is placed in the eye with a small glass pipette or dropper. The use of the purified tuberculin prepared by Calmette's method is considered unnecessary. Calmette's one-per-cent solution of purified tuberculin is in the author's opinion too strong and may do harm.

The Course of the Cutaneous Reaction.—In a positive reaction, after a few hours, a reddening appears which usually reaches its highest intensity between the twelfth and twenty-fourth hour. It may be moderate, marked, or excessive, may disappear within forty-eight hours or last for weeks. There may be, besides the hyperemia, exudation and infiltration, causing the formation of a palpable papule.

The Course of the Conjunctival Reaction.—After six to twenty-four hours the conjunctiva begins to redden, and in reactions of the mild grade nothing more is noticed. In reactions of the second grade the redness is more marked and there may be mucofibrinous exudate. In the third-grade reactions there are all the appearances of a severe conjunctivitis. When the reaction is very severe, boric acid solutions, or a combination of three-per-cent cocaine solution with a one-tenth-per-cent solution of adrenalin, are found useful by the author in relieving the discomfort.

He has observed no unfavorable results from the test. At least 10,000 tests have been reported by other workers. In very few cases have harmful effects followed. Still, much care must be used. The author does not consider ordinary conjunctivitis a contraindication. Tuberculosis of the eye is a contraindication, and in most of such cases the test would be unnecessary. In this connection it is thought surprising that ophthalmologists using tuberculin in the treatment of tuberculosis of the eye did not discover the conjunctival reaction long ago. Diseases of the uveal tract, present or past, are contraindications, and it is wise to ask the patient whether he has had such trouble with his eyes. In children there has sometimes been a lighting up of a phlyctenular conjunctivitis. This disease is almost always a scrofulous manifestation. It should be remembered that scrofulous children possess a hypersusceptibility to the poisons of the tubercle bacillus, and only weak solutions should be employed in making the test, if indeed it is used at all.

Failure to react to either test, in cases of undoubted tuberculosis, the author considers an unfavorable prognostic sign, indicating that the organism lacks the capacity of reacting with its protective forces against the poisons of the disease. Those cases in the first stage of the disease which failed to react have, in his experience, done badly. A much larger proportion of advanced progressive cases have failed to show reactions than those in the earlier stages.

The time of the appearance of the reaction, especially of the cutaneous reaction, is thought to have considerable prognostic value. A promptly appearing, severe reaction indicates a favorable prognosis. The more severe the reaction, the better are the prospects of cure. A quickly occurring mild reaction or the failure to react suggests unfavorable prognosis. A delayed mild reaction indicates a healed or latent adhesion. These principles apply also to the reactions from the subcutaneous injection of tuberculin.

Pirquet, on account of the frequency with which adults react to the cutaneous test, has considered its field of usefulness limited largely to the study of tuberculosis in children. Wolff-Eisner has found that many adults do not react, though a much larger proportion do than when the conjunctival test is employed. He considers that the cutaneous test reveals the presence of latent or healed tuberculosis, while the conjunctival test shows the presence of more or less active lesions. The great value of the cutaneous test is its aid to prognosis. The conjunctival test is a much more valuable diagnostic procedure.

Wolff-Eisner's theory of the mechanism of tuberculin reactions is substantially as follows: Individuals with tuberculous lesions have, all the time, in their blood bacteriolysins to the tubercle bacillus. All

tuberculins contain at least fragments ("splitter") of tubercle bacilli; when these come in contact with the patient's bacteriolysins, endotoxins are set free from these fragments of bacilli and cause the phenomena of the reaction. Analogous phenomena have been observed in the study of immunization to pollen in hay-fever and in Pirquet's study of the "serumkrankheit," as well as in the investigation of immunity in various infectious diseases. It is noted that the frequency with which convalescent typhoid fever patients react to the conjunctival tuberculin test may be due to the superabundant production of bacteriolysins, so abundant that they affect not only the typhoid bacillus but other bacteria as well.

It is impossible in this abstract to do more than refer to many of the interesting phases of the subject which the author has considered in detail. Among them are the confirmation of the tests by autopsy findings, the significance of reactions to repeated tests, the great question of hypersusceptibility considered in the light of recent studies regarding anaphylaxis and the serum disease, the use of the reactions in pediatrics, dermatology, ophthalmology, gynecology, psychiatry, and in veterinary medicine. The special section of more than fifty pages, in which the diagnosis of early tuberculosis is discussed from all points of view, also deserves careful reading. The author believes that it is still too early to come to a final judgment as to the precise relative value of the various tuberculin tests.

QUININE IN CHOLERA.

The *China Medical Missionary Journal* for May, 1908, calls attention to the use of quinine in cholera and recalls the fact that during the epidemic of cholera which raged on the Yang-tse some years ago the surgeon of the U. S. gunboat *Villalobos,* who was traveling on one of the infected steamers, had no other drug at his disposal, so he treated a case with large doses of quinine. At the time little attention was paid to this remedy for cholera, but since then the use of it has been brought before the attention of the profession by Professor Koch, who recommended its use. Ussher in the Philippines, acting on Koch's suggestion, has met with decided success in the treatment of the outbreak of cholera which took place there some time ago, as many as ninety per cent of the patients recovering. The plan of treatment was as follows: Sulphate of quinine in ten-grain doses every hour until the rice-water stools had disappeared and bile was passed in the motions. For suppression of urine, friction of the limbs, hot fomentations, dry cupping over the loins, and sweet spirit of nitre were found useful. When evidence of failing circulation supervened, subcutaneous injection of saline solution proved beneficial.

THE CUTANEOUS REACTION TO TUBERCULIN IN CHILDREN.

Von Pirquet recently described a reaction characteristic of tuberculosis which is obtained on scarifying the skin and inoculating a minute quantity of tuberculin. The site of inoculation becomes red and swollen, and within twenty-four hours a small papule develops. In healthy subjects even a slight reaction is exceptional. Subsequently Calmette described a reaction obtained on instilling tuberculin into the conjunctiva which in consequence of its simplicity and trustworthiness eclipsed the cutaneous reaction, and in a remarkably short time became popular throughout the world. But later experience showed that the conjunctival reaction is sometimes followed by severe conjunctivitis and ulceration of the cornea.

At the meeting of the Société Médicale des Hôpitaux of Paris, on May 15, M. J. Comby read an important paper on the cutaneous reaction in children. He extolled this reaction and claimed for it the advantage over Calmette's reaction of complete innocuousness. He ascribed its want of popularity to the fact that its method of use (the number of scarifications of the skin, their depth, and the dose of the tuberculin) had not been laid down definitely. He has elaborated a method which has the advan-

tages of complete innocuousness, ease of execution, and certainty in diagnostic indication. He uses the one-per-cent solution of tuberculin of the Pasteur Institute, which is also used for the oculoreaction. Instead of scarifications, which are a little painful and to which patients object, he makes three pricks with the vaccine lancet in the deltoid region, telling the patient that he is going to vaccinate him. On the next day and on the day after that he observes the result. If there is no reaction only traces of the pricks can be seen—three small black spots without surrounding redness. If the reaction is positive, after twenty-four hours, perhaps a little later, there is a more or less intense redness around the pricks. This is followed by papules which last from eight to ten days. Several degrees of reaction can be distinguished: (1) slight redness, simple erythema; (2) red papules, papular erythema; (3) red papules with vesicles; (4) red papules with bullæ; and (5) red papules with central eschar and a ring of vesicles resembling anthrax, papulonecrotic erythema. The last three, and especially the last two, forms are very rare. None of the reactions are serious or produce adenopathy or fever. Complete recovery takes place in one or two weeks. This reaction is applicable at all ages and in all forms of tuberculosis.

In the immense majority of cases the cutaneous reaction, like the ocular reaction, is positive only in tuberculous children and is negative in those free from the disease. However, in cases of subacute infection (granulie) and in cases of advanced pulmonary tuberculosis the cutaneous reaction, like the ocular, may be negative. Sometimes the cutaneous reaction is negative in a patient who is very ill, but becomes positive when he improves (when the temperature falls strength is regained, and the pulmonary focus dries up). Conversely, when the reaction is positive while the child is fairly well it becomes negative when he becomes ill. The negative reaction in advanced tuberculosis is not an important drawback of the method. The important point is to recognize tuberculosis in its initial stage when the reaction is of service. —*Lancet*, June 27, 1908.

TREATMENT OF HEMATEMESIS.

Sir Dyce Duckworth in the *Clinical Journal* of June 24, 1908, has this to say in regard to the treatment of hematemesis: In cases of gastric ulcer absolute rest is to be enjoined. The alarm and unrest of the patient are to be allayed. Rest in bed on a hard mattress (with the head low and the feet kept warm), with perfect quietude, is to be secured. Such bleedings are hardly important save as confirmatory evidence of any previously entertained suspicions as to the nature of the case. Large bleedings tend to cease in most instances, and rarely prove fatal in the case of acute depressed ulcers. The patient may promptly show signs of grave anemia. Sometimes the effused blood is not ejected by the mouth, and passes by the bowel. Remember that bleeding is rarely the first recognizable symptom of a gastric ulcer.

The great point in practice here is to put nothing in the stomach for at least four or six hours. Any craving for cold drinks must be firmly resisted as tending to encourage more bleeding and vomiting. The first and best liquid to administer is whey, or more suitably, alum-whey, in half-ounce doses (prepared by adding a drachm of powdered alum to a pint of milk, nearly boiling, and straining through muslin). Later, albumen, beaten up with water and a little glucose (the eau albumineuse of the French Codex), may be given in small amounts, not too frequently. Afterward, milk with one-third of lime-water, or with the addition of liq. calcis saccharatus, B.P., ten minims to the ounce. Lactate of calcium, five grains to the ounce, may also be used. Cream and water is of service also a day or two later. The rectum may be washed out the day after the hemorrhage with a small enema, and subsequently enemata of ordinary saline solution with a little glucose may be given as a nutrient. Large injections are undesirable as tending

to produce vomiting. It is advised to apply ice to the epigastrium, but the writer is not satisfied of its efficacy. Repeated bleeding has been checked by a twenty-minim dose of turpentine, rubbed up with albumen. Ergotin in one- or two-grain doses is employed sometimes, but the writer has had no experience as to its value. Adrenalin, ten minims of one in a thousand solution, is given as a hemostatic, and the author has employed it, but he is not sure that it is quite free from objection, and is not satisfied as to its importance. As a matter of experience, with absolute rest for the patient and absolute non-interference with the stomach, he has found that these cases generally do well, and make good progress toward recovery. There is no risk in a partial starvation for a few days.

It has been alleged that hematemesis may occur without any breach of the gastric mucosa. Duckworth is very doubtful as to this, and strongly suspects that in such cases there has been an erosive lesion. These erosive patches are hardly detectable save for their bleeding during life on opening the stomach, and at a necropsy there may be absolutely no signs of them owing to digestive and post-mortem changes.

In hemorrhage dependent on cirrhosis of the liver much the same treatment is to be employed as just described—absolute rest and quietude, and nothing is to be given by the mouth. The prognosis is always grave, and repeated vomiting of blood with a fatal issue is the common experience in these cases.

In cases of gastric ulcer which prove rebellious to prolonged medical treatment, or manifest signs of adhesion of the stomach to adjacent parts, the operation of gastrojejunostomy is now proved to afford great relief and comfort to the patient. Careful feeding and a well-ordered life are necessary in all cases of gastric ulcer for many months after the lesion is believed to have healed. Unfortunately, it is often impossible to secure such management in the majority of these patients, who are seldom found amongst the well-placed classes of society. Hence we meet with relapses.

THE TREATMENT OF ECZEMA.

KESTEVEN in the *British Medical Journal* of June 27, 1908, states that eczema may be divided into two classes for purposes of treatment: (1) That from within, acting through the sympathetic chain of the functional system, may be denoted the ganglionic or idiopathic form, and (2) that arising from external or local irritation, the peripheral or traumatic.

This classification indicates the line which the treatment should follow with success. Though there is no drug or set of drugs whose action can be called specific in a complaint with manifestations so diverse as in this, there are a select few we can use with confidence to obtain the necessary control over the neural disturbance, either directly or indirectly, be the exciting cause what it may.

Thus, if a storm of gout has upset the sympathetic nerves, with the result of an eczematous eruption, the usual treatment for gout must be adopted, plus a direct nerve sedative. In this instance potassium iodide and acetanilide act well; but colchicum should be avoided, as it dilates the capillaries and tends to increase the exudation, whilst it often has a distinctly irritative effect upon the skin.

In eczema of an asthenic type, from anemia, the indication is the liberal administration of iron with such nerve tonics as strychnine and quinine, to brace up the vasomotors. If alcohol is the irritant, abstinence, with the bromides and atropine, will bring speedy alleviation, the latter because of its peculiar control over the capillaries and power of checking perspiration. It must be given in small doses, however, as increased amounts paralyze the termination of the secretory nerves and relax the capillaries. Dyspepsia, so frequently the exciting cause, calls for careful dieting, attention to the bowels, and correction of the alimentary disturbance, plus such nerve sedatives as bromides in sufficient doses to arrest the gastric nerve irritation.

The eczema that accompanies uterine troubles disappears, as a rule, with its removal, just as the eczema of pregnancy

terminates with the parturition; but a nerve sedative is essential to its immediate relief, and chloral and belladonna are the best here.

As in the above, so in all others, of whatever nature, whilst carefully devoting attention to the exciting cause, the necessary nerve sedatives must form the one chief element in the treatment.

Local applications must be resorted to in addition, and of the thousand and one which have at different times been lauded, there are two or three only which are of assured and permanent benefit. Analgesic action is the desideratum to meet the peripheral irritation. Nothing can compare, for the immediate and permanent relief which it confers, with carbolic acid if properly utilized, but as it has hitherto been applied in almost futile style, its real practical value has not been realized. In almost every treatise on the subject, while it has been highly recommended as a relief to the distressing pruritus, the strength in which it has been prescribed has rendered it useless as a curative agent. Now, carbolic acid, as demonstrated long ago by Dr. Bill, is a most powerful local anesthetic if used in sufficient strength, and the anesthesia which it produces is persistent for a longer period than any other. The burning sensation it causes at first soon passes off, leaving a painless surface. The pure (liquid) carbolic acid applied to a red inflamed eczema gives sharp but short punishment and leaves the part practically dead, and this dries rapidly, forming a scab under which the previously raw surface heals quickly; the scab on falling off leaves the surface clean and sound. This is heroic treatment, and must be applied to only limited areas at one sitting; the pain of the application can be obviated by cocaine if the subject is sensitive, and before the effect of the cocaine has passed off the part will be anesthetized by the carbolic. For small patches, such as appear on the hands, feet, scalp, and ears, it is particularly serviceable. For general use in all eczematous eruptions at every stage the 1-in-11 solution should be used, and though it certainly smarts for a time, it gives immediate relief to the symptoms and rapidly checks and arrests the progress of the eruption.

Tincture of iodine also smarts somewhat, but gives great relief to the itching and burning, and lessens the infiltration. The two together make a happy combination—1 ounce of tincture of iodine to four ounces of the 1-in-11 carbolic solution for a lotion, to be kept applied on lint under oiled silk. In the intertrigo which so commonly occurs between the toes and extends into the tough skin of the feet, a bath of this for the feet, frequently repeated, gives wonderful relief. Starch poultice makes a good vehicle for the applications of this lotion, and is useful on tender surfaces, such as the face and neck, painted on.

Suprarenal extract is a good application previous to the carbolic, owing to its power of reducing the turgescence and exudation, thus leaving the surface fit for its action, whilst applied in the very beginning of the initial erythematous stage, it will often entirely arrest it. Adrenalin is undoubtedly the best form of this substance.

Greasy applications should only be applied in the dry desquamative stage. Used in the moist stages, they only aggravate the trouble by retaining the acrid irritating exudation. This exudation should be constantly washed away with pure cold water, which should be poured very gently over the part, and all friction avoided. Soap, whether medicated or otherwise, should be religiously avoided. Suprarenal added to the water greatly increases the relief it gives.

THE TREATMENT OF EPIDEMIC INFANTILE PARALYSIS.

Allen Starr, writing in the *Journal of the American Medical Association* of July 11, 1908, says that during the early stage of the disease, at the onset, cupping of the back by dry cups applied for a short time only but repeated two or three times a day may relieve the congestion that is present. Ice-bags applied to the spine may have the same effect, and sponging of the body with cool water or with water and alcohol may

keep down the fever to a certain extent. As a rule, children in this stage are in great pain and require some sedative. Acetanilide, antipyrin, or phenacetine in appropriate doses for the age may be given. It is not unwise to use Dover's powders in connection with the coal-tar preparations. The children should be kept very quiet, as their limbs are exceedingly tender. A brisk purgative should be given, and the nutriment during the first two or three days should be chiefly milk. Dr. Cushing, of Baltimore, has recently proved that the administration of urotropin results in the presence of formaldehyde in the cerebrospinal fluid, as demonstrated in his cases of cerebral surgery. This fact, which the writer states he can confirm, may be utilized in the treatment of nervous diseases where an infection is suspected, and hence the use of five grains of urotropin every four hours to a child of eight years, and smaller doses for infants, may be tried during the onset of the disease or until fever subsides. Salicylate of soda has been given also in the early stage by some observers with apparently good effect. The author prefers salicylate of strontium as less likely to irritate the stomach.

After the stage of onset is over and the pain has subsided it is wise to stop medication for two weeks and then begin the use of strychnine, which should be pushed in these cases as far as is consistent with safety. The writer has observed marked improvement under the use of one-fortieth of a grain of strychnine three times a day to a child of eight—a rather high dosage, to be reached only by progressive small increase over the intial dose. The condition of the muscles can certainly be markedly improved by manipulation, by massage, by rubbing the limbs with oil or cacao butter, or allowing the child to play daily or twice a day in a warm bath for half an hour or more, or by applications of galvanism, both constant and interrupted. It is especially important from the very beginning of the case to prevent the development of deformities, which in the majority of instances are simply due to the action of gravitation on the limb whose ligaments are relaxed and whose muscles no longer act on the joints as ligaments. Proper position should, therefore, be insured by carefully adjusted braces when the child is out of bed, and by properly adjusted pillows and little sand-bags to hold the feet in position when the child is in bed. The numerous severe deformities which subsequently require section of the tendons, if neglected, can always be prevented by properly adjusted orthopedic apparatus, and it is never wise to delay the application of such apparatus until the deformity has been produced. The orthopedic treatment of these cases is more important than any other.

RHEUMATOID ARTHRITIS.

In the *Clinical Journal* of July 1, 1908, SYMES-THOMPSON states that rheumatoid arthritis is a disease of weakness, and the treatment must be of a tonic and supporting nature; the patients should be placed in good hygienic surroundings, and be shielded from worry. Any infective focus such as a vaginal discharge should be treated. In the acute stage rest to the affected joints must be insisted upon. The hands are to be lightly splinted, and the patient confined to a couch. Massage for the wasting muscles is beneficial. In the chronic stage we have to deal with joints more or less permanently damaged, and cure is impossible. But much may be done by means of regular massage and movement to mitigate the crippling of the joints, and by climatic and other treatment further extension of the disease may be prevented. There is a liability to relapse, and the joint movements should be remitted when such a suspicion suggests itself. Moderate exercise is to be encouraged, even with a persistently rapid pulse.

The drug which has been followed by most benefit is guaiacol carbonate. It should be given in full doses for six months, and the improvement which follows may be explained on the assumption that it inhibits the growth of certain microörganisms in the digestive tract, with

a constant diminution of the infection of the blood-stream from the intestine. Iron and arsenic may be used to combat the anemia. When the pain is severe aspirin often gives relief, and methyl salicylate may be painted on the joints. An old remedy for the pain is to surround the joints with bags containing hot sand, and remarkable results have been reported recently from Bier's method of passive congestion. This consists in tying a ligature round a limb sufficiently tightly to hinder the venous but not the arterial flow. Some edema is produced, and the application is made for from six to twenty-two hours. One application often relieves the pain for several weeks, but unfortunately the effect usually diminishes with repetition.

Patients with rheumatoid arthritis are very susceptible to cold, and it is found they do best in warm, equable climates, such as Egypt and the Canary Islands. Baths should be ordered with caution, as they tend to be depressing, though brine baths may be spoken of with less reserve. Mud baths are useful in relieving pain and stiffness, and there is nothing to be said against the trial of vapor baths locally applied to the joints.

THE VALUE OF THE OPHTHALMO-REACTION IN THE DIAGNOSIS OF TUBERCULOSIS.

In the *Australasian Medical Gazette* of May 20, 1908, GILLIES, recognizing the reserve that must always attach to a small series of cases, draws the following conclusions:

1. A positive ophthalmo-reaction where a one-per-cent dilution of Calmette's tuberculin is used, in the absence of secondary syphilis and possibly convalescent enteric fever, is diagnostic of the presence of an active or recently quiescent tubercular focus somewhere in the body.

2. A negative reaction does not definitely exclude tuberculosis, but is strongly against its presence, the margin of error being about 13 per cent.

3. The ophthalmo-reaction is as reliable as the ordinary tuberculin reaction, is readily carried out, involves little discomfort and no loss of working time to the patient.

4. The reaction is of no value unless it is certain that the eye has not been previously tested.

5. Where the original reaction has been negative it may be repeated within eight days and a positive result accepted.

6. Where doubt exists as to the correctness of the reaction confirmatory injection, if done, should be performed within eight days where the reaction has been negative, and five where positive.

THE TREATMENT OF ASTHMA AND SOME OTHER CHEST TROUBLES, WITH REFERENCE TO OUT-DOOR SLEEPING.

JACKSON in the *Australasian Medical Gazette* of May 20, 1908, says that he has always urged his asthmatics to give themselves as much fresh air as possible and to get on the veranda at nights and to disregard draughts; this with extremely good results. In common with others he has made the discovery that it is not enough to keep doors and windows open and sleep in a room; much better results are to be obtained by sleeping on the veranda; and though he has seen no reason assigned for this fact, noticed by others, he ventures to suggest that it is due in part to the fact that the veranda is more frequently and fully sunlit, so that the asthma and catarrh microbes are destroyed. We will find sometimes one member of a family constantly suffering from colds, and sometimes we will find that one occupies the only room that gets no sunlight. There is, however, another reason that applies. In hot weather there is a greater tendency to perspire when sleeping indoors. Even when doors and windows are wide open perspiration will constantly bathe an individual who can sleep out-of-doors without perspiring at all. To have one's skin constantly bathed in perspiration is not good. Perhaps this is one of the conditions when a "draught" (of air) is risky. But whatever the explanation may be of the difference between the veranda and the open bedroom, it is quite

certain that asthmatics who have resisted other treatments will very frequently yield to treatment on the veranda; often no other treatment is required.

Treatment of nasal conditions affords relief in many cases. Personally the author has tried cauterizing turbinates and septa. He has removed polypi, straightened septa, cut off spurs, and removed adenoids, etc., in asthma, and is of the opinion that benefit has resulted in consequence, and especially perhaps after straightening septa and removing spurs. In his experience he has never straightened a septum without great relief to the patient's asthma, and the same thing applies to removal of a spur. Sometimes the relief is apparently complete and permanent. The great things necessary seem to be to provide sufficient room to breathe through the nostrils and to cleanse the nasal cavities of any condition distinctly microbic, such as discharge of any kind.

The author is persuaded that oversweating is one of the causes of asthma, as well as of other chest diseases, and it is important to watch the amount of clothing that patients wear, just as much to prevent its being excessive as for the opposite reason.

MILK-FREE FLUID DIET AND RECTAL IRRIGATIONS IN TYPHOID FEVER.

In the *Medical Record* of June 20, 1908, SEIBERT advocates this plan of treatment of typhoid fever. His practical tests showed that typhoidal diarrhea stopped much more readily without than with a milk diet. Furthermore, it was noticed that the fever and the remaining symptoms of systemic infection were lowered from day to day, but only while milk was withheld. On renewing the milk diet, the temperature, the pulse-rate, the tympanites, and the diarrhea soon reached their former heights.

These observations tempted the writer to feed the next typhoid patients with strained soups and water, without milk. The results of these tests (made in the fall of 1889) were so marked that the writer came to the conclusion that milk could do but harm in typhoid fever.

Cantani had used regular irrigations of the colon with a one-per-cent tannic acid solution during an epidemic of Asiatic cholera in Naples in 1861. At Mosler's clinic (in Griefswald) this method was tried later on in typhoid fever, and Backhaut (one of the assistants) reported favorably on this plan in the *Deutsche medicinische Wochenschrift* for July, 1889. The possibility of destroying the typhoid organisms by the tannic acid was questionable, as it could not reach the small intestine, but the removal of the feces by repeated irrigations of the lower bowel appeared rational. For this purpose plain warm water could do the same work, and even better. The success of the first trials of this plan proved the correctness of the supposition, for the rectal irrigations with plain warm water have proved themselves in the hands of the writer, since the fall of 1889, to be but the rational supplement to the fluid diet without milk in every case, for both reduced the amount of typhoid poison in the patient. At first rectal tubes were used, but were soon discarded. Typhoid ulcers may be present in the rectum, even in mild cases.

Since October of 1889 the author has been enabled to test the above plan of typhoid treatment in the first medical division of St. Francis' Hospital. The following rules were followed in all cases:

1. If nausea were present on admission, the stomach was washed out. Then two doses of calomel, each containing two grains, were given within two hours.

2. Rectal irrigations with three pints of warm water were begun at once—in severe cases every three, in milder ones every six, and in mild cases every twelve hours. Bowel hemorrhage, appendicitis, and perforations were the only contraindications.

3. During the first day of treatment nothing but cold water was given.

4. From the second day on, one-half pint of strained rice, oatmeal- or barley-soup, containing the extract of half a pound of meat and the yolk of a fresh egg, well spiced, were given every three hours, five times daily. During the night cold water alone was offered.

5. During the first three days of treatment the patients were not urged to swallow all of their soup, but were persuaded to drink cold water every hour by day and by night. From the fourth day on, strained pea-, lentil-, potato-, and tomato-soup with rice were added to the menu. The desire for more food, coming in uncomplicated cases not seldom on the fifth or sixth day, was met by giving the soups thickly made. The lower the fever, and the more marked the hunger, the thicker the soup. To very hungry patients two or three zwiebacks were given with their soup at the end of the first week. Orange juice was given in water three times daily. Egg-albumen was not given, on account of the possibility of forming toxins.

6. Before each meal fifteen to twenty-five drops of hydrochloric acid were given in one-half ounce of water.

Alcohol was given only to topers. Cold baths were never employed even in hyperpyrexia. Opium was used only in bowel hemorrhage.

During complicating pneumonia sixty to one hundred and twenty drops of 20-per-cent camphorated oil were injected hypodermically, twice daily. No other medication was used.

The results of this plan of treatment were the following:

1. Nausea, headache, delirium, insomnia, tympanites, and diarrhea ceased in most cases after two to three days, and did not recur later on.

2. In uncomplicated cases the temperature began to drop after twenty-four to forty-eight hours daily by ½° to 1° F., and reached 99° F. in the rectum on the morning of the ninth, tenth, eleventh, or twelfth day of treatment, irrespective of the duration of the attack before admission. In a smaller number of cases this occurred within the first week of treatment.

3. In cases admitted with complications (like pneumonia, nephritis, and phlebitis) the intestinal symptoms (tympanites and diarrhea), as well as those of systemic infection of the nervous system (delirium, headache, and insomnia), usually disappeared as readily as in uncomplicated cases, while the temperature, the pulse-rate, and the respirations remained at the height characteristic of the local processes.

4. The complications disappeared more readily than under the former milk diet.

5. Later complications very seldom developed in cases admitted without complications.

CLINICAL OBSERVATIONS ON ANTI-GONOCOCCIC SERUM.

UHLE and MACKINNEY state in the *Journal of the American Medical Association* of July 11, 1908, that Parke, Davis & Co. supplied them with this serum and asked them to determine its value.

Of the twenty-three patients treated, 12 were confined in the hospital; all the others, with the exception of patient 20, were ambulant cases. All of the patients suffering with acute inflammatory complications who were treated in the hospital, and patient 20 as well, were confined to bed. Regarding the action of the serum on the urethral infection, it appears that it has little if any curative action. The improvement in the urethral condition in some patients may be attributed more to rest and hygienic treatment than to any specific action of the serum.

None of the patients suffering with gonorrheal prostatitis was cured. Of the seven cases of epididymitis, improvement was observed in three, no improvement in four. These three patients were confined to bed, with elevation of the scrotum, and it is doubtful if the improvement can be attributed to the serum alone. As is well known, many patients suffering with epididymitis are relieved of acute symptoms when confined to bed and receiving no treatment other than elevation of the scrotum.

If conclusions can be drawn from this limited number of cases, it appears that neither the number of injections nor the time elapsing between injections has any influence on the results of the treatment, as in no case was there what might be termed a prompt improvement, which is to be expected from an antitoxin treatment.

Possibly better results would have followed the administration of larger doses.

The best results were obtained in the patients suffering with arthritis. Three were promptly relieved, and all local evidences of inflammation had subsided in less than two weeks. In one of these Bier's treatment was used in conjunction. As is well known, gonorrheal arthritis is one of the most obstinate conditions to cure, and such prompt relief as was obtained is encouraging. With no other treatment excepting opsonotherapy and Bier's treatment have such gratifying results been obtained. In the case of a patient complaining of pain in the hip and back it is questionable whether the pain was gonorrheal in origin, there being no evidence of articular inflammation.

The patient with gonorrheal myositis showed but little improvement after two weeks' treatment with serum alone, but responded promptly when Bier's treatment was used in addition.

SOME OBSERVATIONS ON BLACKWATER FEVER.

In the *Journal of the Royal Army Medical Corps* for June, 1908, SKELTON expresses his views as to this subject. The writer went out to the African coast with opinions neither orthodox nor heterodox on this matter, but since he has had several cases of blackwater under his own care, and has had the opportunity of seeing other people's cases, he frankly confesses he has come to consider the "quinine school" as the heterodox one. It seems that if one single case can be produced in which blackwater has occurred where quinine can be absolutely excluded (and these cases are well known and constantly met with), then the case for quinine as a proximate cause is considerably weakened. The converse, though, he does not hold to be so true, since the relation between any drug's action and personal idiosyncrasy is, as far as intoxication is concerned, in our present state of knowledge, too uncertain a factor to be produced in argument.

Again, from figures worked out by Plehn, and quoted by Stephens, in connection with the incidence of the disease in quinine-takers and non-quinine-takers, he finds the following:

Quinine-takers.		*Non-quinine-takers.*	
Attacks of malaria....	90	Attacks of malaria....	287
Attacks of blackwater..	6	Attacks of blackwater..	31
Deaths from blackwater	0	Deaths from blackwater.	10%

It seems an extraordinary thing that the same drug acts in the one case as a partial protective, and in the other as a proximate cause. Further, it seems only likely that if one treats an effect with a cause, except in the case of opsonic enthusiasts, the effect ought to be increased. Acting on his convictions, the author treated many cases with quinine, and with quinine in very large doses, with a view not to increase the effect, but to remove a cause by the specific action of quinine. He is quite prepared to admit that there are some people who are unable to take quinine without exhibiting the toxic effects of the drug; but these are people who, if they survive an attack of blackwater, should be invalided home and not allowed to come out again to any place that is malarial, or where they must take quinine to keep alive or in health.

The author has noticed, too, amongst what he hopes he may be pardoned for calling the rank and file of West African medical men, a majority in favor of quinine not being the exciting cause of blackwater; but when great "authorities," such as those generally quoted, disagree, he asks: What is then the general practitioner to do? Imagine, he is away on some frontier, and his only white companion is down with blackwater, whilst the leading lights, sitting at home in professorial chairs, wrangle as to whether or not he is to give quinine to his dying patient. The situation is ridiculous and unworthy of modern medicine. An unfortunate point about the whole controversy is that so much is decided at home by "authority," and no one in the face of such authority cares for the responsibility of looking out for himself. One thus comes to the rather sad conclusion that, as far as blackwater is concerned, we know practically no more about it now than was known in 1898, when Dr. Crosse wrote his

celebrated article on it in the Transactions of the Epidemiological Society of London.

No account of the various views held by authorities as to the proximate cause of blackwater would be complete without calling attention to the results that are known to occur after infection by various species of piroplasma. It will be remembered that the piroplasmata are probably closely related to the malarial parasite. They are generally placed in the class of Hæmosporida, which includes, of course, Plasmodia. Halteridia, Hæmogregarina, and the Piroplasmata. Piroplasmosis occurs in all sorts of animals, and the leading symptom in all its forms is hemoglobinuria. In dogs it is popularly called malignant jaundice. At the time of writing it is not generally agreed upon that there is a *Piroplasma hominis,* doubt having been thrown upon the piroplasmic origin of the spotted fever of the Rocky Mountains.

It may also be noted that certain forms of piroplasmata under the microscope look almost exactly like the parasites of malignant tertian fever. The tick is the intermediate host of the piroplasma. But the tick does not infect any other animal directly; an infected tick gives rise to an infected progeny, so it is the next generation that is infective.

Before finishing with the etiology of blackwater, the author gives his own personal views on the subject. He states, in his own mind, he sees two conditions: (1) Hemoglobinuric paludism, which is what he personally means when he speaks of blackwater fever; (2) a quinine intoxication, supervening in many cases of paludism, which is what he personally does not understand by blackwater fever; and he is quite prepared to find that what he means by blackwater fever will one day be found to be a disease *sui generis,* and a disease to which only paludics are susceptible.

The exciting cause of blackwater is not merely a subject for academic discussion, but is a very vital point, as it must necessarily affect the treatment.

The lines upon which one may act are: (1) Antimalarial—that is, according as one believes it to be a paludic hemoglobinuria, or *vice versa;* or (2) simply systematic, making no attempt at striking at any specific cause. This practically means a masterly inactivity. The first of course will be combined with the second as far as relieving distressing symptoms goes.

In a series of twenty cases, eight have been treated with cassia bereana—*i.e.,* practically under (2); ten have been treated with atoxyl by injection. Under systematic treatment there has been one death. Under atoxyl there was also one death. The author states he has never lost a case that has been treated by quinine. This gives a total mortality of 10 per cent.

Under (1) the line he takes up is as follows: He gives a simple soap-and-water enema and gets the rectum well washed out. He then slowly siphons into the rectum the following: quinine sulphate 50 grains, acid hydrochloride dilute q. s. to get it in solution, warm water 3 ounces. A small medicinal enema like this he has found is always well retained. He has always wanted to find out how much of this is really absorbed, but the technique for its estimation is elaborate and beyond his resources. At the most he does not expect more than one-half is absorbed, if as much. He gives quinine by the rectum, as he is convinced that it is the most comfortable way. If the hypodermic method is used, say, under the skin of the arm, more often than not the arm remains painful for some days, no matter what aseptic precautions be used. Very much the same happens if quinine be injected into the muscles of the buttock. He has used this method frequently for treatment of ordinary malaria, but after having seen many cases suffer very severe pain at the site of injection he has discarded it. He repeats the quinine after twenty-four hours. Thus he considers he has, at any rate, removed the cause, and any stray parasite that may have escaped the first administration falls a victim to the second.

The most distressing symptom, as he has already mentioned, is vomiting. This must be relieved as soon as possible. In the milder cases an effervescent mixture may

relieve it, but this is useless in the more severe cases. For some years past at the Military Hospital at Tower Hill, Sierra Leone, a trial has been made of the liquid extract of cassia bereana, a root that has acquired some notoriety in Zanzibar. It is claimed that this drug has some specific action as well. He has never seen it do any good, and the best that can be said of it is that it has never been known to do any harm. He had two West Indian negroes with blackwater both admitted to hospital the same day. Both had a high temperature, about 104° F., and both were passing black urine in fair quantities. He gave the one quinine enemata, and the other 40 minims of liquid extract of cassia bereana, every two hours. The quininized patient's temperature dropped to normal in twelve hours and did not rise again, and the following evening his urine was clear. The temperature of the other man came down by lysis, but his urine did not quite clear up for four days. The author was greatly struck at the time by the contrast afforded by these two cases. The drug he relies on to stop the vomiting is morphine; he injects ⅓ grain and repeats it after six hours. He also applies hot fomentations to the stomach area. It has failed him only once, the case being Corporal F., who vomited almost incessantly for twenty-four hours. He neglects the fact that there may be an accompanying nephritis in blackwater cases. The vomiting has to be stopped, and morphine is the only drug that he knows of that will do it quickly. He has seen no ill effects from the use of this drug. As soon as it seems likely that the patient can retain anything in his stomach, he returns to quinine, which he gives in 5-grain doses every morning, accompanied with a tonic of iron and arsenic.

Those who do not believe in the efficacy of quinine, or rather those who believe it to be a positive danger, most usually fall back on the so-called "Sternberg treatment," as used for yellow fever. This consists in the administration of 10 grains of bicarbonate of soda and 30 minims of liquid perchloride of mercury, to be taken every two hours, ice-cold. The principle of the treatment in yellow fever is to "combat the acid diathesis."

Captain F. Harvey, R.A.M.C., has demonstrated that between soldiers in normal health and patients suffering from malaria there is no difference in the alkalinity of the blood. The same held good for a small series of blackwater cases that came under his notice. He then fed healthy natives on large quantities of carbonate of soda. It made not the slightest difference to their blood alkalinity. The theory of any acid diathesis in blackwater appears to be founded upon a coincidence of symptoms rather than upon scientific fact.

Treatment of Complications.—As long as the patient is secreting urine in fair quantity—that is, at least 40 ounces per diem—the writer considers he is progressing as well as may be expected, but when the quantity is diminishing, even if the temperature is falling, matters are not going so well. This double fall is a kind of danger-signal. There is, presumably, a gradual mechanical blockage of the glomeruli in progress, and suppression is the next step. Two cases of practical total suppression yielded to a combination of a hot-air bath, 1 minim of croton oil, and the infusion of 4 pints of saline solution. In one case, by the time the author had got the infusion apparatus ready, the patient was comatose and he had abandoned all hope of saving him. He rallied slightly after the infusion, and an hour afterward had a most violent rigor; this was followed by profuse sweating, and he eventually passed 16 ounces of urine in the next twelve hours. An injection of pilocarpine is also an invaluable aid to the hot-air bath, etc.

Relapses are fairly common, and usually are a very serious complication. The mortality is generally high. Kohlstock, in the Kamerun, using no quinine, had no death in eight cases. F. Plehn had one death out of 25 cases (4 per cent), and A. Plehn lost five out of 58 (9.8 per cent). These, apparently, were cases treated in hospital, for out of 53 treated outside 15 died (43 per cent). The general average is stated to be

about 20 per cent. Dr. Steuber, in his observations on the employment of European troops in the tropics, puts the mortality from blackwater after cholera and before enteric. A. Broden, writing from Leopoldville, mentioned the case of a doctor who gave injections of quinine (grammes 1.50 to 1.80 a day), and lost seven cases out of 12 (58 per cent). Some other mortality statistics are Steudel (German East Africa), 16 to 17 per cent; Reynolds (Gold Coast), 50 per cent; Beranger-Feraud (Senegal), 23 to 24 per cent; Koch (German East Africa), 21 per cent; and Schellong (Malay Archipelago), 42 per cent.

FIBROLYSIN IN THE TREATMENT OF CONTRACTED SCARS.

In 1892 Hebra introduced a substance which he called thiosinamine for the treatment of lupus. This substance is chemically allyl-sulpho-urea. It was found that it exercised a peculiar action on scar tissue in causing it to swell, stretch, and become soft. It soon became evident that the injection of such a drug would be of use in the treatment of contracted scars. Cognat introduced a combination of thiosinamine and ethyl iodide under the name of thiodine. This preparation possessed disadvantages in having a disagreeable smell and in being little stable. The objections raised against thiosinamine were that it is but little soluble in water; that injections are painful when it is dissolved in alcohol; and that it is inactive when taken internally.

A new preparation has more or less recently been introduced under the name of fibrolysin, which is a chemical combination of thiosinamine and sodium salicylate. It is freely soluble in hot or cold water, but the solution undergoes oxidation when kept in the presence of air and light. It has therefore been put up in sealed vials, in which the solution seems to be indefinitely stable. Each vial contains 2.3 cubic centimeters of a solution of 1.5 grammes of fibrolysin in 8.5 grammes of water. Each thus corresponds to 0.2 gramme of thiosinamine.

F. Mendel (*Berl. Klinik*, October, 1907) deals at some length with the theoretical and practical aspect of this preparation. He shows that fibrolysin is non-toxic in therapeutic doses. After intravenous injection the substance is split up into its constituents and a garlic-like odor is noted in the expired air. Intramuscular injection is to be preferred to subcutaneous injection and at times even to intravenous injection. It is painless, is active, and easy to carry out. The allyl odor is noticeable after the injections, but since this is but of short duration and is an indication of the rapid splitting up of the compound, it must be regarded as a sign of the activity of the preparation. After discussing the selective action on scar tissue which has been determined by careful microscopical observation, he turns to the method of application and the dosage. Intravenous application must be carried out with scrupulous aseptic precautions. The corpuscles are not damaged in the least degree by the drug. The fluid should never be injected before a column of blood has entered the syringe, when the piston is withdrawn, so that one is certain that the needle is inside the lumen of the vein. For adults 0.2 gramme of thiosinamine—that is, 2.3 cubic centimeters of fibrolysin—is injected as a dose. Children require less, but seldom less than half this dose. The injections should be repeated every one, two, or three days, according to the severity of the case. The maximum number of injections which the author has employed was 50. Individual susceptibility toward the drug is met with at times. The symptoms produced in these cases are headache, sleepiness, and feeling of malaise. Fever also has been met with. He speaks of the results which he obtained with fibrolysin, and states that they are satisfactory provided one does not expect the scars to stretch unless active dilatation can be applied—for example, it will be useless in pyloric stenosis unless the muscular wall is still in good condition.

Becker also praises the action of fibrolysin (*Deut. med. Woch.*, Oct. 24, 1907). He obtained excellent results in Dupuytren's contraction and in the after-treatment of injuries. Stiff joints only respond to the

treatment to a certain extent, and the complete mobilization of the joint must not be expected if inflammatory conditions have taken place.

H. Lang (*Deut. med. Woch.*, Nov. 28, 1907) speaks of the good results which he has obtained in urethral stricture with fibrolysin. He reports on two cases which he has been able to follow closely. In one case a traumatic stricture of fifty-three years' standing was softened and dilated by its means, and in both cases no tendency to recontract has yet shown itself. The cures had lasted for seventeen weeks in the first case and fourteen weeks in the second, so that, although he does not wish to speak of permanent cures, it looks as if the strictures will not return, at all events rapidly.—*British Medical Journal*, June 6, 1908.

AN ANALYTICAL STUDY OF SIX HUNDRED CASES OF ANESTHESIA.

In the *New York Medical Journal* of June 13, 1908, HAROLD L. SPRINGER after an analysis of many cases of anesthesia reaches the following conclusions: He urges that the importance of this subject be given more recognition by medical colleges, and that each student receive more individual instruction and experience. Furthermore, he urges that in hospitals the anesthetist be the most experienced man on the interne staff instead of the least experienced. He believes that ether and chloroform are apparently the most satisfactory anesthetics, and that ether is safer than chloroform, but under certain circumstances, when chloroform is desired, the risk may be materially lessened by giving oxygen with it.

The average patient in his experience was ten minutes becoming anesthetized, and it required two and one-half ounces of ether to obtain this condition.

The average length of time of the operation was one hour and a quarter, and it required five and one-half ounces for this time, or, in other words, about six ounces was used during the first hour, and about three ounces for the second hour.

While most of the evidence at hand points in favor of vomiting being due to a centric disturbance in ether anesthesia, his records show a close relationship between excessive secretion of mucus and vomiting.

In the treatment of accidents most dependence may be placed upon ammonia in the form of inhalation, and oxygen.

The more remote consequences of anesthesia, such as status lymphaticus, acetonuria, acidosis, hepatic toxemia, etc., must not be lost sight of, and general anesthesia should be preceded by a thorough examination of the heart, lungs, and kidneys.

CAMPHORIC ACID: ITS ACTION AND USES.

TYRODE recalls the fact in the *Boston Medical and Surgical Journal* of June 11, 1908, that with the knowledge that camphor possesses a marked pharmacological action —*i.e.*, a powerful stimulant effect on the respiratory and vasomotor centers and on the heart itself—considerable interest has been shown in some of its derivatives. One of the best known is the oxidation product, camphoric acid. For many years the latter has been considered to possess an action analogous to camphor on respiration and circulation; but besides, it was reputed as an excellent remedy against pathological sweats, as those occurring in pulmonary tuberculosis.

Various theories were entertained concerning the antihydrotic action, but strangely enough practically no serious experimental work was performed to settle the question. Most authorities assumed that it paralyzed the sweat glands like atropine, but Kobert, the eminent pharmacologist, devised the ingenious theory that its action was due to a stimulant effect on the medulla, that excessive sweating in phthisis was the result of improper aeration of the blood, and as camphoric acid increases the function of the respiratory center, it overcame the partial asphyxia.

Until last year the only work upon the influence of this acid upon respiration was done by Wagener in 1886. It consisted of only one experiment, from which the conclusions were erroneous.

Fujitani performed a research on cam-

phoric acid in 1906, and also came to the conclusion that it stimulates respiration. When examining his protocol it is easy to see that he misinterpreted his own experiments. He used the Marey tambour and drew his conclusions from the rise in the respiratory curve, which he obtained for a few seconds during and after the injections of the drug, in spite of the fact that within a minute or so the respiration fell as low or even lower than normal. His transient rise was obviously the result of reflex stimulation.

The writer's work on respiration was performed with a gasometer connected with the trachea, and the actual amount of air respired in a given space of time was measured. From these experiments he was unable to observe any constant, significant rise in the respiratory capacity, even with the use of enormous doses. In fact, as much as eight grammes failed to produce an effect in several rabbits.

The work on the circulation and isolated heart was also negative. Warm-blooded animals failed to show any symptoms, and did not die after very large doses given both subcutaneously and intravenously in the form of the sodium salt of camphoric acid. Administered internally in large amounts this acid causes death from gastro-enteritis, and if unneutralized in herbivora, it produces acid intoxication.

In experiments where the flow of urine was observed, the latter was found increased as after any neutral salts injected intravenously.

When administered in the dose of one gramme per day, rabbits weighing about two pounds showed no changes in their metabolism for periods of months.

The action on the sweat glands was studied on the paws of young cats with completely negative results.

No action was seen on frogs unless these animals received from 1-20 to 1-10 of their body weight of the drug, and death occurred from general paralysis, as would happen after most neutral salts in such concentration, from the changes in the osmotic tension of the tissues.

Upon inquiry, the writer found that camphoric acid had been used by several of his colleagues in the clinics for the night sweats of consumption without beneficial results. He invited some of them to test the substance again, but the results were, as a rule, unfavorable.

Since it had been employed abroad as a urinary antiseptic, he requested a specialist of genito-urinary diseases to try its efficacy. The latter obtained good results in a number of cases of cystitis with an acid urine, but no amelioration in those with an alkaline secretion.

After having performed over one hundred experiments upon animals, the author is forced to the conclusion that camphoric acid as such acts in the same order as the other organic acids, which are not decomposed in the body; that in combination as a sodium salt, which is formed in the intestines, it acts like any neutral salt, such as sodium sulphate—*i.e.*, its ions have so little activity that it possesses only the action derived from its physical properties, "salt action." He further sees no justification in its use as a respiratory and heart stimulant, nor as an antihydrotic in the tubercular night sweats. Yet it may be of some utility as a urinary antiseptic, because it may have, in common with many other free organic acids, slight antiseptic power.

THE TREATMENT OF SCABIES BY BALSAM OF PERU.

AVISS writing in the *Journal of the Royal Army Medical Corps* for June, 1908, reminds his readers that the use of balsam of Peru in the treatment of scabies is frequently urged in its columns. It certainly cures the scabies, but in many cases the results of the application are much worse, for the patient, than itch. The author has recently had under his observation three cases, not without interest.

One, after one application of the balsam, developed an intense erythema, followed by desquamation, albuminuria (no blood), and general edema. It was not a case of scarlet fever, and is still in hospital. The other two cases developed an acute eczema with

much pustular exudation affecting the whole body, likewise after only one application of the balsam. They each spent about six weeks in hospital while their eczema was getting well. In view of these facts the author has returned to the old and cheap soft soap, scrubbing brush, and sulphur ointment treatment, which is, to his mind, just as efficacious as the balsam method.

Eczema, which costs 2 shillings to produce, and leads to six weeks in hospital, is to be avoided if possible. The writer agrees that the balsam is good for early ringworm. For old cases he has not found it any better than the ordinary methods of treatment.

PRURITUS ANI.

In the course of an article in the *New York Medical Journal* of June 13, 1908, MASON remarks that certain errors of digestion as well as certain articles of food may start an attack of pruritus. In the opinion of the author coffee is more harmful than any other article of diet, and will alone produce the disease in certain persons. All of these things should be searched for, and if found, given careful attention. The author refuses to treat a person who maintains the habit of drinking any form of alcohol.

As a rule, the treatment must be long and tedious, and unless the patient will make every effort to assist in bringing about a cure he refuses to treat him.

There are many formulæ that are used with more or less success, a few of which are here given. Tuttle speaks highly of the following:

℞ Ac. carbolici, ʒij;
Ac. salicylici, ʒj;
Glycerini, ℥j.

M. Sig.: Apply with camel's-hair brush after bathing with hot water.

Mathews recommends:

℞ Camphor and phenol, ʒj;
Glycerin, ℥j.

M. Sig.: Apply after using hot water, and repeat frequently, if necessary.

In cases in which there are fissure-like cracks at the junction of the skin and mucous membrane, Cripps recommends the following:

℞ Ext. conii, ʒj;
Ol. ricini, ʒj;
Lanolini, ʒj.

M. Sig.: Apply frequently.

An ointment of chloroform as follows acts nicely in many cases:

℞ Chloroformi, ʒj;
Petrolati, ℥j.

M. Sig.: Apply frequently.

This must be put up in a wide-topped bottle and kept tightly corked, as otherwise the chloroform will soon evaporate.

Where the parts are too moist the treatment is often assisted by the use of powders that will absorb the moisture. Plain starch has given good results in many cases. Dry calomel many times is very useful. The following has given good results:

℞ Camphor, ʒij;
Carbolic acid, gtt. 15;
Precipitated chalk, ℥ij;
Zinc oxide, pulv., ʒij;
Perfume, q. s.

M. Reduce the camphor with alcohol and mix the others through bolting cloth of one hundred meshes to the inch.

The author has operated under chloroform three times by removing a section of the skin for about an inch on each side of the anus, and then undermining the surrounding skin and drawing it together to cover the denuded surface and stitched it to the mucous membrane of the bowel.

In two cases he secured good results, while the third patient was lost sight of. This procedure was suggested to him by Dr. Hamilton, and as a means of last resort he believes it to be very valuable. He intends to make further use of it as opportunity arises.

Patients should always be told not to scratch the parts, although this warning is seldom heeded. If the itching is so severe as to interfere with sleep, have them use hot water, gradually increasing the temperature, until it is nearly scalding. In case this is not sufficient to give relief, an ointment of chloroform, one drachm to one ounce of petrolatum, may be applied. A

weak solution of carbolic acid in water and glycerin will often give relief when all else fails. The following mixture is a most excellent one:

℞ Sodium hyposulphite, ℥j;
Carbolic acid, ℥ss;
Glycerin, ℥j;
Distilled water, ℥iij.

M. Sig.: Apply frequently on compresses.

Also:

℞ Cocaine, gr. ijss;
Ext. rhatany, gr. xv;
Ext. hamamelis, gr. vij;
Petrolatum, ℥v.

M. Sig.: Apply freely.

Dr. Buckley recommends the following, and the author can testify to its merits:

℞ Ungt. picis, ℥iij;
Ungt. belladonnæ, ℥ij;
Tr. aconit. rad., ℥ss;
Zinci oxidi, ℥j;
Ungt. aquæ rosæ, ℥iij.

M. Sig.: Apply freely.

The writer has cured several patients by injecting cocaine under a small portion of the skin where it is thickened and then cauterizing it with the actual cautery. After healing has taken place, another area is treated in the same way. This makes the parts quite sore, but not more than is bearable, and most patients are willing to put up with it if it is likely to cure them.

While the principal attention should be paid to the skin in order to get relief from the itching, yet measures should be taken to cure the catarrh in the bowel above by having the patient wash out the bowel with solutions of boracic acid and then injecting a 25-per-cent mixture of glycerite of hydrastis (not fluid extract). Other antiseptic astringent solutions may be used, such as would be beneficial in catarrhal conditions in other parts of the body.

Owing to the difficulty experienced in effecting a cure in some of the chronic cases that have come to him for treatment, and being anxious to try anything that held out any hope of cure, the author was led to try the Roentgen rays. While his experience has not been great in the number of patients treated, it has been so satisfactory that not only himself but his patients have been delighted with the result.

This method is only useful in old chronic cases where the skin is eczematous and thickened. Just what the action is that brings about a cure he does not attempt to say, but that the eczema disappears and the skin returns to its normal condition, or nearly so, is beyond question. It is too soon to say positively how permanent the results are going to be, but from the appearance of the skin the writer thinks there will be no return if the bowel above is put in a healthy condition.

His technique is as follows: With a soft tube he gives an exposure of ten minutes' duration twice a week, until he learns how the skin is going to stand it. If there is no irritation he gives three treatments a week until a brown discoloration appears. All treatment is then stopped until this goes away, when treatment is resumed until it reappears. This is usually enough, but if possible he thinks it is well to give an occasional treatment after this as a matter of precaution.

THE PROPHYLAXIS OF SURGICAL INFECTIONS BY IMMUNIZATION.

LERDA (*Archiv für klinische Chirurgie*, Band 85, Heft 2) says, as a result of a review of the literature, together with his observations in immunization upon guinea-pigs and rabbits, that it is possible to produce in a short time in guinea-pigs and rabbits by vaccination with mixed sterilized cultures of staphylococci and streptococci, or better, by their endotoxins, an observable grade of immunity against these germs. The immunity is of a polyvalent character. This is confirmed by most investigators. The vaccination does not produce in man such great disturbance as is produced in vaccination against pest, cholera, and typhoid fever, and there is no evidence that the influence is not as great. Vaccination is a useful supplement to modern aseptic procedure. The time required for producing an active immunity is so long (eight to twelve days) that its influence cannot be waited for in the abortive treatment of trau-

matic sepsis. In the face of the impossibility of carrying out an absolute asepsis and the fact that the resistance of the organism is not always sufficient to combat infection, it is important that surgeons should acquaint themselves with the theory and practice of immunization against the most frequent infections.

THE TREATMENT OF ECZEMA OF INFANTS AND YOUNG CHILDREN BY THRYOID.

EASON (*Scottish Medical and Surgical Journal,* May, 1908) briefly reports a series of consecutive cases of eczema in young children successfully treated by thyroid. In the first case, fourteen months old, the baby had suffered from eczema of the face for nearly a year. This had been entirely resistant to the usual applications and internal treatment, nor was hospital treatment more efficacious. Two and a half grains of a thyroid tablet was given daily. In a little more than one month the child was entirely well. His cure persisted for nearly a month, when the disease showed a tendency to recur. The second course of thyroid was followed by a permanent cure. The four other cases gave similar results.

INTESTINAL ANASTOMOSIS WITHOUT OPEN INCISON BY MEANS OF BASTING STITCHES.

PARKER and KERR (*Johns Hopkins Hospital Bulletin,* No. 206, 1908) describe what they regard as an easy and rapid method of suturing applicable to every form of intestinal anastomosis, whereby the immediate formation of a patent stoma may be accomplished without operative opening of the intestinal lumen and without the introduction into it of any instrument or ligature.

The procedure is an extremely simple one. It consists essentially in the use of a Cushing continuous stitch, without knots, to temporarily close the intestinal incision, a separate stitch being used for each of the two visceral openings that are to be sewn together. These stitches remain in place only while the permanent sutures are being applied. On account of their method of application and the temporary purpose which they serve, they bear a certain likeness to the "basting" stitches of the seamstress, and for convenience they have called them by that name.

The steps of the operation and the advantages which they believe it to possess may be briefly summarized as follows:

Division of the intestinal walls is made between two narrow-bladed crushing clamps, placed first in actual contact and then slightly separated so that there is left between them a narrow, crushed area, consisting practically only of serosa and fibrous coat, which may be divided by the knife or cautery.

The basting stitch is a Cushing continuous stitch without knots, placed upon the clamped incision with the loops between the stitches crossing over the blades of the clamp. When the clamp is removed and the stitch at the same time drawn tight, the edges of the incision are automatically inverted and held firmly pressed together in a straight line without any separation of the opening having occurred. The two incisions, so prepared, are then placed side by side, and are stitched together around the whole circumference of the intestinal tube or of the new operative opening that is to be established. When the last suture has been placed and tied, the basting stitches are cut short and withdrawn, the intestinal canal, or the new anastomotic stoma, then instantly becoming patent. This completes the operation as far as the suture of the intestines is concerned. The lumen has not been opened, and it has not been entered by any instrument or other object. The stoma becomes open only with the withdrawal of the basting threads. The steps of the operation are essentially the same whether circular, lateral, or end-to-end anastomosis is done.

The operation so performed calls for no time-consuming maneuvers and no more than ordinary manipulative skill. The basting stitches are as easily and as quickly placed as the purse-string suture used to turn in the stump of the appendix or grasp the Murphy button. Upon removal of the

clamp the stitch is at once drawn tight by a single motion, and the incision, securely closed in a straight line, is then ready for suturing without further attention. The turning of the cut edges which takes place is automatic and never requires the use of an instrument to assist it as in the case of the purse-string suture.

With the two basting stitches in place, intestinal suture, at any rate in dogs, becomes singularly free from its usual difficulties. Only a single assistant is ever needed, and even he may be readily dispensed with. The parts to be joined are held in the most convenient position and under perfect control, so that the stitching is done with surprisng rapidity and ease.

The troublesome eversion of the mucosa and the vermicular contractions of the muscular coats no longer exist. Approximation of serous surfaces to any desired extent and at a uniform distance from the margins of the incision is assured. The inversion of the cut edges presents a folded wall through which to pass the stitches, making precision in their application, with secure anchorage in the fibrous coat, particularly easy.

Handling of the intestines is reduced to a minimum. The hands of the operator need scarcely touch them, and those of the assistant not at all.

In end-to-end suturing the small triangular peritoneal defect at the mesenteric border is automatically obliterated by the basting stitch, insuring apposition of serous surfaces at this point.

A striking advantage of the method is seen when the two incisions to be joined happen to be of unequal length. In this case the longer one is simply puckered or "gathered" in upon its basting thread until it corresponds in length with the shorter incision, and the sutures are then applied. The authors have successfully united in this way without the slightest difficulty intestinal incisions, one of which was double the length of the other.

In the beginning of the experimental tests of this method a single discouragement was met with. This occurred in the first three operations upon dogs, done on three consecutive days, the animals dying of obstruction, due to turning in too much of the intestinal wall. This is the one fault to which the method may easily lend itself if the operation is carelessly done, but one which it is equally easy to avoid. It is practically only in dogs of small size, or in young children, with intestines having a very small lumen and relatively thick walls, that this danger applies. Subsequent success even with dogs of the same size demonstrated that these initial failures were not due to a fault inherent in the method.

For a more detailed description of some of the steps of the operation which is necessary it will be sufficient to take the classical example of end-to-end suture after resection.

At each point where division of the intestines is to be made two parallel clamps grasp the flattened tube transversely or at an angle from the free border to the mesenteric border. The method of dividing the intestinal walls between these clamps has already been described. Circumvection ligation of the mesenteric vessels, going to the portion to be resected, and removal of that portion, follow. There remain then the two intestinal ends that are to be joined, each closed by a strong clamp. The intestinal walls have been divided flush with the blades of the clamp, so that no tissue whatever projects.

The next step is the application of the basting stitches. Holding the clamp in his left hand the operator enters the first bite of the stitch on the side of the flattened intestinal tube facing him, close to the mesenteric border, at the point where the peritoneum begins to be reflected away from the bowel wall. This first bite of the stitch is taken parallel with the axis of the intestines and in a direction toward the clamp, emerging about one millimeter from its edge. Now turning over the clamp the thread passes over its blades, and the second bite of the stitch is taken in the opposite side close to the mesenteric border as before, but this time parallel with the blades of the clamp and about one millimeter from its edge. These first two stitches are most important,

since by them the mesenteric angle is turned in obliterating the peritoneal defect at this part of the incision. The third, fourth, and following stitches are exactly like the second and are taken alternately, first in one side and then in the opposite side, until the free border is reached. The last bite of the stitch, taken in the free border, is again like the first bite, parallel with the axis of the intestine, but this time taken in a direction away from the clamp, entering about 1 millimeter from its edge. Thus the first and last stitches in the mesenteric and free border respectively are parallel with the axis of the intestine. All the intervening stitches are parallel with the blades of the clamp and as close as possible to its edges. All the loops of the stitch pass loosely over the blades of the clamp.

It will be seen that this is simply a Cushing right-angled continuous stitch, since all the individual stitches on one side of the incision correspond with intervals between stitches on the opposite side, exactly as in the Cushing stitch.

Both ends of the basting threads are left eight or ten inches long. No knots are tied. Medium heavy white silk is used for the basting threads to distinguish them from the black silk used for sutures. A straight or curved intestinal needle may be used as preferred.

The clamp is now loosened and carefully drawn from under the loops of the stitch. The thread is grasped, one end in each hand, and by separating the hands strongly is made taut, the effect being to produce instant and automatic inversion of the edges and secure closure of the incision in a straight line. Both mesenteric and free borders are inverted as well as the lateral walls.

When the crushing clamp grasps the intestinal tube it pushes aside the mucous membrane on the inside and the two muscular coats on the outside, leaving practically only fibrous coat and serosa between its blades. When the clamp is removed there is seen a narrow ridge of crushed tissue consisting of these coats of the two intestinal walls glued together by the pressure to which they have been subjected. Even in the dog's intestine, with its thick muscular coats, the lips of the incision do not separate during the few seconds intervening between the removal of the clamp and the pulling taut of the basting stitch. Unless this is purposely delayed, allowing time for the vermicular action of the muscular coats to pull apart the edges, the mucous membrane is never seen.

The other end of the divided intestine having been prepared in the same way, the next step is the uniting of these two ends by sutures. The assistant grasps the long free ends of the two basting threads, those from the mesenteric borders in one hand and those from the free borders in the other, and holds the two threads taut and parallel with each other, adjusting them so that the two intestinal ends, hanging from the middle of the threads between his hands, unite mesenteric border with mesenteric border, and free border with free border. It will be seen that when the two ends of the flattened tube are so held there are four intestinal walls lying in contact with parallel edges. A detailed description of the application of the sutures is unnecessary. Almost any form of a stitch may be used. Turning the corners presents no difficulties. Two precautions are essential—not to cross the line of the basting thread with any of the stitches, and not to catch the basting thread itself with a stitch. When the permanent stitching is finished and the basting threads have been cut short and withdrawn, the intestinal tube is rolled between the fingers at the suture line to make sure that the lumen is patent.

The writers do not recommend any particular form of suture to be used exclusively in this method. They feel sure, however, that the general preference for a continuous stitch in circular suture of the intestine is well founded. The tension to which intestinal stitches are subjected under ordinary conditions comes wholly from internal pressure in the intestinal tube. In hydrostatics the law which applies to such a case is that in a thin-walled tube subjected to internal pressure the circumferential strain upon the

walls of the tube is double the longitudinal strain. As applied to circular suture of the intestines, this means that the longitudinal strain which tends to pull the edges of the incision apart equals only half of the circumferential strain which tends to tighten the stitch if a continuous suture has been used.

Hemorrhage in intestinal operation is not likely to give trouble with this method, but it would be unsafe to conclude that it might not do so in operations upon the human stomach, and therefore the method is far from having been sufficiently tested to be recommended for that work.

The assistant may be altogether dispensed with. The operator in that case passes the long basting threads over the thumb and index-finger of his left hand with the two intestinal ends hanging between them, the ends of the threads being twisted around the little finger to hold them taut.

It is possible to put in the basting stitches before instead of after the incisions have been made, but the method does not seem to have any advantages over the one described.

An attempt to show how quickly any procedure may be carried out in an experimental operation seems unprofitable and misleading, therefore the authors have not tried to make a record. Working deliberately and doing every step with painstaking care, they found, comparing a number of trials, that the application of the two basting stitches, removal of the clamps, and drawing taut of the threads require about four minutes. A single continuous stitch around the circumference of the stoma takes about four or five more, so that the time required for the intestinal suture proper may be placed at about ten minutes. This leaves out of account the time required in the resection, and in opening and closing the abdomen.

In the following fifteen observations, dogs ranging in weight from 13 to 30 pounds were used. They were all thoroughly anesthetized with ether. The after-treatment consisted of fluid diet after twenty-four hours, and chopped meat after two or three days.

The specimens were examined from three to one hundred days after operation, and a fair idea of the process following the suture could be obtained. In no case was there any leakage. In the first three cases a solid septum had formed from the careless turning in of too much tissue. This was never encountered again. In experimenting by this method with calves' intestine or dead human intestine, where the lumen is large and the walls proportionately thin, the turned-in edge was not more than one-eighth of an inch wide and offered no stricture or possibility of obstruction. In one case examined three days after operation the turned-in edges had atrophied to a fine fringe of tissue one-sixteenth of an inch wide. In two others, in which a transverse end-to-end anastomosis had been made, some stricture with dilatation and hypertrophy was found. This was first noted by Edmonds and Ballance in 1896 and advanced as an objection to end-to-end anastomosis. In the subsequent cases this was entirely done away with by using the oblique incision. Stricture, hypertrophy, or dilatation has never been found following this procedure.

HEMORRHAGE FROM THE STOMACH AND DUODENUM.

W. J. Mayo (*Surgery, Gynecology, and Obstetrics,* May, 1908) notes that a single hemorrhage from a patient who has not had previous gastric symptoms is probably not due to ulcer, and holds that bleeding from the stomach is neither a sure sign of ulceration, nor is its absence a contraindicating one. Indeed, he holds that hemorrhage from ulcer is by no means of frequent occurrence. Copious hemorrhage at infrequent intervals is the history of a considerable percentage of ulcers, whilst continuous small hemorrhages are the rule in cancer; 96 per cent of gastric and duodenal hemorrhages cease spontaneously. Fatal hemorrhages usually incident to involvement of the splenic vessels produce death so quickly that an operation cannot be performed.

Bleeding ulcers divide into three groups: First, the acute round peptic ulcer, which Mayo states in his observation was not round but rather a small fissure, the detection of which was difficult. The second variety is a mucous erosion. These two forms are both probably toxic in their origin, are both rare, and are usually medical affections. The third variety—*i.e.*, the chronic ulcer—constitutes a surgical affection, though not necessarily operative during the acute stage. Mayo states that more than 90 per cent of acute hemorrhages from the stomach are from chronic ulcers with a well-marked ulcer history. In the greater number the condition would have warranted operation independent of the hemorrhage. When there is hemorrhage from the stomach without previous history of ulcer, the burden of proof must show why an operation should be performed; while in hemorrhage from chronic ulcer the burden of proof must show why an operation should not be performed.

In case of small hemorrhages gastrojejunostomy is an efficient curative agent. When the ulcer is some distance above the pylorus, permitting of ready egress of stomach contents by the normal outlet, gastrojejunostomy is of less value. In connection with gastrojejunostomy, if the ulcer exists in the stomach it should be excised if possible. Where this is not feasible the main blood-vessels leading into it should be ligated and the peritoneum and muscular coats drawn over it. Bleeding ulcers which lie a considerable distance above the pylorus should be excised. Should the deformity incident to the removal of the ulcer and its plastic closure materially interfere with drainage from the pylorus, gastrojejunostomy is indicated in addition to excising. In hemorrhage from duodenal ulcer, ligation of the blood-vessels and closure of the outer coats over the indurated area, with gastrojejunostomy, will be found efficient.

In the majority of ulcers, both of the stomach and duodenum, the blood-vessels leading into them are varicose. In severe hemorrhage from the stomach in which no ulcer can be located on the exterior, the anterior wall of the stomach is opened by a longitudinal incision, and by counter-pressure over successive areas the mucous membrane is caused to present itself at the opening until the bleeding point is detected. With chromic catgut on a small curved needle the hemorrhagic area is sutured from the mucous side. Over this, from the peritoneal side, a few linen sutures are introduced for protection.

THE SURGICAL TREATMENT OF CANCER OF THE SIGMOID FLEXURE AND RECTUM.

MOYNIHAN (*Surgery, Gynecology, and Obstetrics,* May, 1908) after calling attention to the fact that the first essential in all operations concerned with malignant disease is that the removal of the parts shall be free and that it shall follow certain lines, notes that in the large intestine the growth itself must be removed, also the bowel on each side of the growth, the lymph vessels which drain the bowel, the glands in which these vessels end, all the primary glands and as many of the secondary as are accessible, and finally all the tissues in which these glands and accessible vessels lie. In the case of the sigmoid flexure and of the upper part of the rectum this will involve the removal of the growth and the healthy intestine on each side of it, and the excision of all the glands which lie along the arteries as far up as the inferior mesenteric artery at its origin from the aorta. At the point where this vessel arises a lymphatic gland is always to be found; it lies along the artery before the origin of the left colic branch, and is the highest of the chain, which, beginning at the intestine (in any part), extends upward along the sigmoid superior hemorrhoidal arteries to the inferior mesenteric trunk. This gland, therefore, and all the glands which lie below it, must be removed if the necessary conditions for a radical cure are to be fulfilled. In such removal the inferior mesenteric artery may have to be ligatured either immediately beyond its origin or after the left colic artery has been given off. Probably

in many cases the gland can be stripped down from the vessel by firm wiping with gauze after the peritoneum above it and on each side has been lightly divided.

Moynihan, however, has found this impossible in two of his cases; therefore he ligatured at its origin. The ligature on the artery is the summit of a wedge of material to be removed, the base of which lies at the intestine; nor is the length of the intestine which has to be excised to be specially considered, since the more freely the gut is sacrificed the less likely is necrosis to follow and the more certain is the end-to-end anastomosis to be successfully accomplished. In one of Moynihan's cases, 14½ inches of the intestine was removed and end-to-end suture easily performed.

The two chief points of significance in the operation are:

1. The mobilizing and displacement of the intestine. This is carried out by making an incision through the peritoneum at the outer side of the mesosigmoid, at the points where this mesentery springs from the parietal peritoneum. The sigmoid together with its mesentery is then stripped up from the iliac fossa toward the aorta, the peritoneum on the inner side of the sigmoid being lifted off the posterior surface at the abdomen until the middle line is reached. This stripping extends well upward and downward, until the whole flexure and the upper part of the rectum are attached only by a leaf of the peritoneum on the inner aspect. At a later stage of the operation the descending colon and the splenic flexure are similarly mobilized, by incising the peritoneum to their outer side and above the flexure, and by stripping the gut inward to the middle line. The middle and left colic arteries are in the peritoneal fold, which now forms, as it were, a mesentery for the bowel. The result of this freedom of the intestine is that it can be quite readily drawn down so that the descending colon reaches well into the pelvis, and could, if there were need, be made to extend to the anus. In carrying out this maneuver the transverse colon also may be loosened, so that its central V-shaped dip is straightened. The splenic flexure is normally, of course, fixed high up on the left side; in its altered position it is made to descend several inches. This procedure has to be performed before it can be realized how perfectly simple it makes this displacement or transplantation (if one may so term it) of the intestine. The result of it is the bowel is rendered so free that it can readily be placed in such a position that the end of the descending colon can be brought into easy apposition with the divided rectum and union then secured by suture; and the vascular supply of the parts is secured by the preservation of the vessels in the peritoneal fold, by which alone the mobilized gut now remains attached.

2. The condition of the vascular supply. It might perhaps be supposed that the severance of the inferior mesenteric artery would deprive a large part of the sigmoid and of the descending colon of its blood supply. This, however, is not the case. If the middle and left colic arteries be examined, it will be found that they anastomose at about two inches from the intestine, in a vessel which runs parallel with the bowel; from this artery straight branches pass to the intestine. That the circulation through this vessel is carried on quite freely after section of the inferior mesenteric may readily be demonstrated in any operation by loosening the clamp applied at the upper severed end of the sigmoid flexure; free hemorrhage occurs at once. An examination of the vascular supply of the transverse and descending colons and the sigmoid shows clearly enough that the sacrifice of the direct supply to the left colic artery, by ligature of the inferior mesenteric, is not in the least likely to interfere with the easy transmission of blood through the vascular arch which the left colic makes with the middle colic above and with the sigmoid and superior mesenteric below. The important outcome of this is that the upper divided end of the sigmoid flexure, at whatever high point the division is made, is freely supplied with blood, even after the inferior mesenteric trunk has been divided.

These two points, then, make it clear that

a great length of bowel may be sacrificed and the normally fixed parts of the large intestine above the division be rendered so mobile that their transplantation is a matter of no difficulty; and further, that the high division of the inferior mesenteric artery, made necessary by reason of its close relation to glands which it is imperative to remove, does not devascularize the upper end of the bowel which is to be engaged in an end-to-end anastomosis.

The precise details of the operation to be practiced will depend upon the exact position the growth may occupy. Mayo describes the procedure necessary in a case of growth about the middle of the sigmoid flexure as follows: The patient is placed in the Trendelenburg position and a long incision made in the middle line. A Doyen's valve-retractor now, or a little later in the operation, gives a good exposure of the pelvis. The intestines are packed away with swabs, only the rectum being at first visible. The sigmoid is lifted up from the posterior abdominal wall, and with the scalpel or scissors an incision is made in the peritoneum of the iliac fossa, immediately to the outer side of the mesosigmoid. This incision is continued down into the true pelvis, keeping close to the intestine, and up along the outer side of the descending colon. A piece of gauze wrapped round the fingers now strips up the mesosigmoid from the iliac fossa, and the separation is continued steadily toward the middle line. The ureter is to be displayed in all the length of the incision, so that its security is in no doubt. The spermatic vessels are also seen, and are carefully handled, to avoid damage to the vein, which tears readily. The freeing of the peritoneum on the inner side of the sigmoid and the descending colon is continued until the aorta is reached, and the inferior mesenteric trunk is recognized at its origin. The bowel is now quite freely movable and can be turned well over to the right, attached by a single leaf only of the peritoneum in which the vessels lie. This peritoneal leaf is translucent; by holding it up to the light the exact line of the vessels can be seen, and the position of many of the glands defined. The raising of the peritoneum with the bowel has been carried out in such manner as to leave the pelvic wall bare; all fat and glands and vessels are raised up with the fold of the serous membrane. Into the space made bare a large hot moist swab is packed. The inferior mesenteric artery is now surrounded by an aneurism needle at its origin; it is tied in two places with strong catgut, and divided. From this peritoneal wound two incisions are made, the one upward toward that point where the sigmoid flexure or descending colon is to be divided, the other downward over the aorta and along the front of the sacrum to the rectum at the place where its division is necessary. To meet the lower end of this peritoneal incision, a continuation is made of the incision already begun on the outer side of the sigmoid. The two meet across the front of the rectum or the lower part of the sigmoid. The point of their union is determined by the position of the growth. At this stage all that is necessary to remove the wedge-shaped area to be sacrificed is the division of the intestine above and below. This is effected between clamps, after sedulous care has been taken to avoid infection. The liberated mass is then removed. It may be ten inches long at its intestinal base, or even more. The free vascularity of the upper extremity of the bowel may be demonstrated by a slight loosening of the clamp. The approximation of the two ends of the intestine would now seem perhaps to be almost impossible, but the mobilization of the descending and the splenic flexure will soon render their anastomosis easy. When, however, it seems likely that this displacement of the descending colon will be needed, it is desirable to carry it out before the intestine is severed so as to be certain of a perfectly aseptic operation field at the time. The end-to-end anastomosis is then completed in the usual way.

For a growth in the rectum the same principles apply. The highest gland in the lymphatic chain, that which lies on the inferior mesenteric artery, must be taken away. Nothing less will do. The inferior

mesenteric artery must then be divided, either above or possibly beyond the origin of the left colic artery. The peritoneal incision begins to the left of the upper part of the rectum and the sigmoid, and both these are wiped upward with gauze toward the aorta. They are rendered mobile before anything else is done. The inferior mesenteric is then divided, the peritoneum incised downward over the front of the sacrum, the middle sacral artery ligatured, and the sacral hollow wiped clean by repeated applications of gauze stripping little by little. When this has been done the amount of freedom which it is necessary to give the descending colon must be ascertained, and be provided. End-to-end anastomosis, when the bowel has been severed, will not always be possible inside the abdomen, for probably only four or five inches of the lower part of the rectum remain. In such circumstances the upper end of the rectum is tied with a stout catgut ligature before division. After the removal of this growth an assistant passes a pair of forceps into the dilated anus and seizes this tied end of the rectum, which is then inverted until the ligatured end can be made to protrude beyond the anus. The upper divided end of the sigmoid is then pulled through the anus with forceps and an anastomosis made by Maunsell's method. Many of the details of this procedure are the same as those laid down by C. H. Mayo (*Surgery, Gynecology, and Obstetrics,* 1906, iii, 240). The essential differences are that in the method Moynihan describes the bowel above is freely mobilized so that easy end-to-end anastomosis is possible, a greater length is removed, and the excision of the entire glandular group is insured. It is probably safe to say that this last and most essential feature of the operation has never previously been suggested or adopted as a routine procedure. In the operations generally practiced colostomy is performed too frequently. This serious drawback to the cosmetic attributes of the operation can be avoided, strange though it may seem, by a higher division of the arteries, and by a wider removal of the intestine, provided the principle of displacement of the colon be duly observed.

For low rectal cancer Moynihan has never carried out an abdominal operation, but if adequate measures are to be taken to remove the invaded area in accordance with the principles laid down, no other course than this seems rational. Operations which merely go "wide of the disease" do not meet the necessities of the case. We have not yet sufficiently realized that the surgery of malignant disease is not the surgery of organs: it is the anatomy of the lymphatic system. The inherent futility of all purely sacral operations seems to Moynihan to be quite evident.

If it is true, as Moynihan endeavored to show, that the descending colon and the upper part of the sigmoid flexure retain their vitality after the sacrifice of the inferior mesenteric artery, and if the mobilization of the colon and the splenic flexure permit a considerable displacement of these portions of the bowel, then in all cases of carcinoma of the sigmoid flexure or of the rectum, whether high or low (the proctodeum excepted), an abdominal operation seems desirable, for by this route alone can the whole lymphatic territory be extirpated. The observance of the practice described in this paper should do much to abolish the operation of colostomy as a necessary part of the radical operation for cancer, though it will, of course, always be demanded for those cases in which obstruction calls urgently for relief.

BACKWARD LUXATION OF THE SHOULDER.

ELLERBROEK (*Deutsche Zeitschrift für Chirurgie,* Band 92, Heft 4-6) states that posterior luxation of the shoulder-joint so seldom occurs that further report of observations is necessary. In the Göttingen Polyclinic only nine cases were observed between January 1, 1890, and January 1, 1907, although in this time 584 dislocations were observed in this clinic. Backward dislocation of the shoulder is due in most

cases to direct force applied from before backward with immediate luxation. It can occur indirectly from a fall upon the outstretched hand or the elbow while the arm is strongly adducted and directed forward. It occurs relatively very often during voluntary or involuntary muscular action, as in throwing an object, or in an epileptic seizure, or during difficult birth.

The treatment in the author's clinic consists in placing the patient under anesthesia, making light traction upon the humerus in the direction of its long axis, and at the same time pressing the head of the humerus back into its proper position. Then a fixation bandage is put on, and after fourteen days slight movements may be cautiously commenced. At last massage and electrical treatment are to be carried out. The results in the author's nine cases were good.

RESECTION OF THE INTESTINE IN GANGRENOUS INTUSSUSCEPTION IN CHILDREN.

DAMIANOS (*Deutsche Zeitschrift für Chirurgie,* Band 92, Heft 4-6) calls attention to the high mortality following resection of the bowel in acute gangrenous intussusception in children, and states that he has found in literature only nine cases of cure as against 27 in which the outcome was fatal. In addition to this there are seven cases recorded in which enterostomy was done, all of which were fatal. The mortality is not due to the resection but to the gangrene itself.

The author's method is as follows: If, upon opening the abdomen, the invagination tumor is already gangrenous, he would refrain from resection only when the wide extent of the invagination renders the technique impossible, or when the child is in a marked state of collapse. In these cases a fecal fistula is produced above the intussusception. In all other cases resection is done. After resection, one of two courses may be pursued: the cut ends may be joined at once by end-to-end or lateral anastomosis, or the ends may be sutured into the belly wound and anastomosis be done at a second operation. The latter choice is to be highly recommended.

The author's first case was published in the *Deutsche Zeitschrift für Chirurgie,* Band 75, S. 439. The second case was as follows: A nine-year-old girl, with a history of several probable previous attacks of intussusception with spontaneous reduction, was admitted to the hospital after four days' illness in a state of collapse. The abdomen was much distended, nowhere tender to pressure, no tumor was palpable. After an enema, dark, bloody fluid was discharged from the rectum. On account of the collapse, which was made worse by the journey to the hospital, the operation was put off until the next morning. On opening the abdomen the peritoneum was found highly injected and its cavity contained a brownish fluid; a tumor the size of the fist was found in the lower right side of the abdomen, and proved to be an intussusception of the ileum. The intestine was gangrenous and tore easily on handling. The intestine was resected from about 10 centimeters below to 5 centimeters above the intussusception, the ends sewed into the belly wound, and the peritoneum closed with drainage. Under free saline infusion and camphor injections the patient recovered from the shock of operation. Two days later end-to-end anastomosis was performed and the abdomen closed with drainage. There was uninterrupted recovery, and the patient was discharged six weeks after the operation with the wound healed; several kilos gain in weight; digestion undisturbed, although 65 centimeters of the ileum had been resected; two or three soft stools a day. Nine months later the patient was in splendid health.

The third case was a ten-year-old boy, taken on the morning of admission with some abdominal pain, especially on the right side, and vomiting. The child was poorly nourished, abdomen much distended, slightly tender; temperature 37.4°; pulse very frequent; stool fluid and not bloody.

The diagnosis was uncertain, so operation was delayed. The symptoms grew

worse, though no mass was palpable. Two days had elapsed, when the patient grew much worse, and died. On autopsy an invagination of the ileum was found 30 centimeters above the ileocecal valve. A portion of the intestine was grayish-yellow and thinned out.

The author calls attention to the great difficulty which sometimes attends the diagnosis of intussusception.

TRAUMATIC LACERATION OF THE CARTILAGES OF THE KNEE-JOINT.

BÜDINGER (*Deutsche Zeitschrift für Chirurgie,* Band 92, Heft 4-6) concludes a study of injury to the cartilages of the knee-joint, as follows: Laceration of the cartilages is one of the most frequent results of traumatism of the knee-joint. The favorite seat of the injury is upon the patella, next upon the summit of the condyles of the femur. The injury consists chiefly in rupture of the cartilages, especially over a subchondral hematoma, or in lateral displacement of the cartilage of incrustation. Direct injuries of the cartilage through neighboring fractures and secondary injuries of the cartilage are not considered.

Numerous lacerations of the cartilages heal spontaneously in a clinical sense. Functional disturbances of the joint occur if the cartilaginous flaps protrude into the joint; if the cleft becomes wider by separation at the line of injury; if a chondritis develops about the site of laceration; or if parts of the cartilage become detached. The clinical diagnosis is, as a rule, impossible. Therapy can be only that which is usual for traumatic gonitis—that is, of an expectant character—and under definite indications, arthrotomy. The operative treatment consists in complete removal of the diseased portion of the cartilage. This demands a complete inspection of the joint cavity, which is best made through a Langenbeck bow-shaped resection incision with tilting up of the patella. Lacerations of the cartilage are found most often near the hypertrophied fatty tissue under the patella, probably because the injury is the cause of this hypertrophy. Rarely this hypertrophy of the subpatellar fat is the only result of the injury.

OPERATION ON MELANOTIC TUMORS OF THE SKIN.

PRINGLE (*Edinburgh Medical Journal,* June, 1908) after pointing out the extreme malignancy of these melanotic growths and the fact that they develop secondary nodules along the course of the lymph vessels and affect the nearest lymphatic glands, believes that operation should be early and free. His method of procedure is to remove the tumor itself by a wide incision, carrying the cut up along the lymphatic vessels to the first and if possible the second group of lymphatic glands, removing these, together with a strip of subcutaneous and deep fascia. This he advises even though the resulting wound may be two or three feet in length.

SUPRAPUBIC PROSTATECTOMY.

MOYNIHAN (*Practitioner,* June, 1908) after stating that it is but a few weeks ago that he completed his first 100 cases of suprapubic prostatectomy, and after some observations upon the development of the operation, thus gives the details of the surgical procedure.

Since the patient is always a middle-aged or an old man, and is not seldom enfeebled by the long-standing distress and infection which the prostatic obstruction has entailed, spinal anesthesia is employed. From 0.5 to 0.7 Cc. of a 10-per-cent solution of stovaine is injected between the third and fourth lumbar vertebræ in the following manner: The patient is made to sit over the side of the operation table, with his back arched, the elbows resting on the knees. The skin of the back is prepared very carefully, and the area around the point to be punctured is painted with tincture of iodine. A needle, armed with a cannula, is then introduced slightly to the right of the middle line, and a little above a line joining the highest points of the iliac crests. This is above the fourth lum-

bar spine. As the needle is pushed deeply in, it may encounter bone; if so, it is withdrawn, and its direction slightly altered. Its passage through the ligament is recognized by the fact that a rather greater resistance is offered by this structure. As soon as it is pierced the stylet is withdrawn from the needle, and cerebral spinal fluid begins to flow. About 30 or 40 drops should be allowed to escape, and a long, blunt-ended cannula, attached to the loaded syringe, is then passed through the needle. The pressure of the cerebral spinal fluid is sufficient to push the piston of the glass syringe out to its fullest extent. The fluid, mixing with the stovaine, forms a milky liquid, which is slowly injected.

The bladder is then thoroughly washed out and distended with 10 or 12 ounces of saline solution. A median incision immediately above the pubes, 2 to 3 inches in length, is made, the recti muscles are separated, and the bladder exposed. A layer of fat, which should be teased away or wiped away with gauze until the bladder wall is clearly seen, covers it. Some large veins may be seen, and care is taken to push them aside, so that an avascular area on the bladder is exposed. This is incised, and the finger at once passed into the bladder. Then, on each side, a silkworm-gut suture is passed through all the layers of the abdominal wall about one-half inch from the incision, and through the bladder wall. The sutures are tied in such manner as to hold the bladder close to the under surface of the parietal wound. The sutures are left long and are held by a clip on each side. These stitches hold the bladder up to the abdominal wall, and prevent it being stripped away from the back of the pubes during the subsequent manipulations. In not one of his cases has he seen suppuration in the cavum Retzii, and he believes that this absence of infection is due to the firm hold secured by these lateral sutures.

The bladder is now explored with the left forefinger, any calculi removed, and the prostate is examined. The fingers of the right hand, which is covered by a rubber glove, are introduced into the rectum; one finger is usually enough, but two may be used. By their aid the prostate is held up toward the bladder, and the stripping of the prostate with the left finger is begun. It is best, as Hurry Fenwick suggests, to pass the index-finger into the internal meatus, and by scraping through the mucosa there, to begin the enucleation of the prostate. The stripping is, as a rule, quite simple, but there is no need to hurry over it. The more cleanly it is done, the more rapid will the healing be. One lobe, generally the largest, is first stripped, below, at the sides, and above; then the other lobe; and finally the anterior part is separated from the triangular ligament. The urethra is divided last, generally by a special "nipping" with the finger-nail; and the prostate is in the bladder. The right hand is then removed from the rectum, and a nurse removes the glove by turning the cuff down over the hand. A vulsellum forceps is then passed into the bladder and the prostate removed. It is astonishing to find how small a cavity is left by the removal of a large prostate.

A catheter is now passed, and the bladder thoroughly irrigated with one-per-cent solution of carbolic acid. If there has been any cystitis, this lavage may well be continued for twenty or thirty minutes, until all oozing is stopped. A stitch at the top and one at the bottom of the wound are introduced, and the operation is complete. No tube is introduced into the bladder. The tube is not necessary, and only does harm. It is not necessary because urine flows quite easily through the wound, where for twenty-four hours it is collected in pads made of gauze and cellulose wadding. If a clot should form in the bladder, the wound may be opened a little by traction upon the lateral sutures. A tube produces pressure on the wound and makes its edges sloughy and dirty, whereas they should remain clean. It materially lengthens the time necessary for healing. In Moynihan's early cases the average date of closure of the wound was the twenty-sixth day. In his last 50 cases there have been very few

that were not healed completely in two and a half weeks. The average day of closure is now the fourteenth day. In one case the wound did not discharge at all after the first thirty-six hours, and the patient left the nursing home with the wound soundly healed on the ninth day. If strict asepsis is observed, and if no tube is used, the rapidity of the healing is much increased. After the second or third day the bladder should be washed out through a catheter every twelve or twenty-four hours. On the third day a Colt's apparatus is applied, with which the patient can sit up comfortably. Colt's apparatus is of the greatest possible value in these cases; it has both simplified and hastened the after-treatment. The bladder should be washed out daily, a soft-rubber catheter being passed, and the lavage continued until the lotion (one-per-cent carbolic acid) returns quite clear. The application of Colt's apparatus does not interfere with this procedure; it rather makes it an easier and a cleaner process, for the lotion after leaving the bladder is conducted to the side of the bed by the narrow rubber tube attached to the glass cup.

The patient should be allowed to sit up in bed from the first, and should be got up out of bed as soon as possible. This was a point upon which Mr. McGill always insisted. In all cases he orders 30 grains of acid sodium phosphate to be taken in one pint of water two or three times daily. It helps to keep the urine sweet and acid, but it is apt to cause diarrhea. The dose should then be lessened. Lemonade is given freely, if the patient cares to take it. As much fluid nourishment as possible is given, and if there is any appetite, solid food is not withheld. It is important to see that the legs are not kept too still; they may be elevated a little at night, or massaged in order to prevent stasis of the blood in them, and to avoid thrombosis of the veins.

In all cases the mass of the prostate should be removed in one piece. This involves the removal of the prostatic urethra. In the first case in which Moynihan did this, it was quite accidental. The gland shelled out so readily that, before he was aware of it, the whole mass with the urethra was free. He was very anxious as to the outcome of this, but when all went well he was disposed to try the removal of the urethra with the prostate as a routine procedure. This he did, and the favorable experience to which he drew attention in the paper in which he advocated this measure (*Annals of Surgery*, 1904, xxxix, 1) has been repeated in his later cases. In several instances he has taken away not only the prostatic but also a part of the membranous urethra, and never has any disability followed. But what appears to be the whole prostatic urethra is very frequently found when the specimen is carefully examined to be only the part behind the verumontanum; the anterior part of the prostatic urethra is untouched, and the ejaculatory ducts probably remain intact.

On certain occasions difficulties will be encountered in stripping the prostate. These difficulties are chiefly in connection with rather small "fibrous" prostates. The base of the bladder is hard, very stiff and unyielding, and no line of easy separation can be found. When the gland is at last removed, it will not improbably be found on microscopical examination to be malignant. In three cases he found enucleation to be quite impossible, and he therefore had to be content with digging out as much of the gland as he could get. There is another type of malignant case which he has met with on several occasions. The prostate is large, soft, easily separable, except over a small part of one lobe, which can with difficulty be stripped. The gland, when examined after removal, shows a hard, shaggy patch quite different from the smooth, rounded contour elsewhere. Such a gland will show on examination a malignant change in this small area, the remainder exhibiting the usual adenomatous enlargement.

In his own cases there have been 8 deaths—3 deaths in 15 (probably) malignant cases; 5 deaths in 85 simple cases. Of these deaths, two were due to pul-

monary embolism, on the eleventh and fourteenth days respectively; suppression of urine in two cases; shock, death occurring within twenty-four hours, in two cases, both malignant; the other two cases died of gradual exhaustion, due in large measure no doubt to a failure in their work of kidneys long diseased.

TREATMENT OF GONOCOCCUS ARTHRITIS.

IRONS (*Journal of Infectious Diseases,* June 4, 1908) thus summarizes an admirable paper on this subject:

Systemic infections by the gonococcus tend to spontaneous recovery. In many of the cases of gonococcus arthritis the clinical manifestations are acute, and the course extends over a few days or weeks. Certain cases, however, do not recover so quickly, and the condition passes into a chronic stage which may last months or years. In the first class of cases immunity develops rapidly, and clinically little benefit appears to result from the injections of dead gonococci. In the chronic cases, the mechanism of immunity fails to rid the body of the organisms, and they persist either in the original lesions or in one or more foci, such as the prostate, and give rise from time to time to new lesions at various points of localization. When dead gonococci are injected a reaction frequently follows with an increase in constitutional and local symptoms. This reaction is later followed by a period of improvement. The fact that with a dose of constant size the reactions become less with each injection would seem to be a strong argument in favor of the value of the injections in hastening the development of immunity. Clinically in a number of cases the injections of dead gonococci have seemed to be of distinct value.

Many more series of cases must be studied before a definite opinion can be expressed, but the results obtained thus far seem to indicate that in certain cases at least of gonococcus arthritis recovery can be hastened by the injection of dead gonococci. No harm has appeared to follow the injections, and it is possible that the use of larger doses will be found desirable in some cases.

With further work the limitations as well as the advantages of the method will appear, and it should be recognized that while it is attractive theoretically as a specific therapeutic measure, too much must not be expected of it in the way of marvelous cures. It should be used rather in conjunction with other general measures, such as rest, aspiration of joints distended with fluid, massage of the prostate, and other surgical and general hygienic treatment.

The reliability of the clinical gonococcus reaction as a diagnostic procedure will also be determined only after many tests. It has many points in common with the tuberculin reaction, and similarly, too, there may well be cases of gonococcus infection found which do not respond. It appears, however, to be well worth a trial. Should the reaction prove to be reliable, a valuable and much-needed aid will be at hand for the diagnosis of obscure joint, synovial, and periosteal diseases.

Until recently it has not been deemed expedient to carry on experiments on certain other phenomena of hypersusceptibility incident to gonococcus infections such as the ophthalmic reaction, though this work has now been begun. It has already been noted that the local reaction after the injection of dead gonococci is greater in cases of gonococcus infection than in normal individuals.

ABDOMINAL POSTURE IN OPERATIONS ON THE PLEURA AND LUNGS.

ELSBERG (*Medical Record,* May 23, 1908) bases his practice upon an experimental investigation in which he demonstrated that a dog on its back will sometimes stand a double pneumothorax when the opening in each pleura is a very small one, not more than 1 or 2 millimeters in diameter and very slowly made, whilst with the dog on its belly an opening almost 1 centimeter in diameter can sometimes be made in each pleura, if cautiously done,

and the animal will often continue to breathe and survive for hours.

Elsberg operated on all his patients, on whom the opening of the pleura was needful, whilst they were lying flat on their abdomens. Care was taken that the patients were deeply under the anesthetic at the moment the pleura was opened. The author states that he has operated on a large number of patients with empyema, upon two patients with abscess of the liver, upon three with subphrenic abscess, and upon one with a bronchiectatic cavity in the left lung. Patients in whom a normal pleura had to be opened showed unusually few untoward symptoms when the air was allowed to enter the pleural cavity. In the patients on whom an operation for empyema was done it was noted that with only one exception the coughing and interference with the breathing regularly observed when the opening of the pleura is made for this affection was entirely absent.

CHRONIC NEURITIS OF THE ULNAR NERVE.

SHERREN (*Edinburgh Medical Journal*, June, 1908) has been able to collect twenty-one reported examples of this condition, to which he adds two cases of his own. He reviews the information obtained from these cases as follows:

In nineteen cases in which the sex is mentioned, sixteen were males; this is undoubtedly due to their greater liability to injury in this situation, for of the sixteen cases due to injury in which the sex is mentioned, only one was a female.

The deformity in the region of the elbow was usually cubitus valgus, due, in the majority of cases, to an epiphyseal separation or fracture of the lower end of the humerus. Dislocation of the head of the radius was the cause in one patient, and in another the deformity was congenital. In some instances a backward enlargement of the internal condyle due to injury was the only deformity present.

A considerable time elapsed between the onset of the deformity and the development of symptoms, varying from six to thirty-five years. In most instances no cause other than the deformity could be discovered, but one patient thought that change of work had had something to do with it.

In all in whom there is a note on the condition of the nerve behind the internal condyle, it was found enlarged in a spindle-shaped manner, and when examined at operation was smooth and free from adhesions to surrounding parts. Interstitial neuritis was seen in the two instances in which this portion of the nerve was microscopically examined.

This chronic neuritis appears to be due to the irritation or pressure to which the nerve is subjected behind the internal condyle in movements of the elbow, owing to the alteration of its bony relationships here. The length of the nerve is increased, and in those cases in which the cubitus valgus is marked, the olecranon is displaced and is prominent. In other cases the constant passage of the nerve over a backward enlargement of the internal condyle in movements of the elbow is the irritating agent. These internal injuries, and not those due to external violence, seem to be the cause of the fibrosis.

In most cases adult life was reached before symptoms presented themselves; thus, out of fifteen examples in which the age is noted, eleven occurred between the ages of thirty and forty-five, one at sixty-three, one at twenty-eight, and two at nineteen. It is not altogether easy to explain the variations in the time at which the symptoms arise and the long latent period in many cases. But a similarly long latent period is present in patients who develop symptoms of nerve involvement in association with cervical ribs.

The fibrosis is slow and the interference with the functions of the nerve gradual; a marked growth of fibrous tissue may take place under these circumstances before pain or muscular wasting occurs. From the size of the spindle-shaped swelling when the patient first comes under observation, it is evident that the condition has been in existence for a considerable time. This and

the greater liability to chronic inflammatory processes after youth has passed probably account for it to a great extent.

Errors in diagnosis still arise in connection with these cases. As the abductor-opponens group of muscles is not affected, the appearance of the hand, if muscular wasting is present, limits the lesion to the ulnar nerve after the diagnosis of a peripheral cause has been made.

When pain arises in the distribution of the ulnar nerve accompanied by wasting of the intrinsic muscles supplied by it, apart from a recent injury, this condition should be suspected, the course of the nerve in the forearm investigated, and the condition of the elbow-joint carefully examined. If cubitus valgus is present which is not due to injury, the possibility of the symptoms being due to dislocation of the ulnar nerve must be considered. In these cases the symptoms arise suddenly following a fall with flexed elbow, and the ulnar nerve, which is not necessarily enlarged, can be made to pass over the internal condyle.

It is essential to make the diagnosis, as the treatment of the two conditions is different. The condition of sensibility and the electrical excitability of the affected muscles should be carefully investigated, for on this depends the correct treatment.

Permanent cure is only to be expected as the result of operative treatment. In early cases great improvement follows rest, but relapse takes place when the patient resumes the use of the limb. When the signs of interference with the functions of the nerve are not complete (incomplete division), means must be taken to remedy the deformity and so prevent injurious pressure upon and irritation of the nerve. This will vary with the cause of the deformity, and necessitate excision of the elbow, or chiseling a fresh groove for the nerve behind the internal condyle, or osteotomy of the humerus. In one case the nerve was removed to the front of the joint and the nerve sheath split. Sherren does not view with favor splitting the sheath of the nerve. It is open to the objection that adhesions form between the nerve and adjacent structures, and it leaves the way open for increased formation of fibrous tissue in the nerve. The treatment should be by removal of the cause of the neuritis.

When the signs of interference with the functions of the nerve have advanced to the establishment of the reaction of degeneration, or in cases of incomplete division in which the relief of pressure fails to cure the patient, the damaged portion of the nerve must be removed and the anatomical continuity restored.

EFFECTS OF SUN RAYS AND ARTIFICIAL HEAT.

CORBUSIER (*The Military Surgeon,* June, 1908) classifies this subject as follows:

1. Siriasis (insolation)—that pathological condition in which the actinic rays are the predominating factor. It is characterized by violent headache; vomiting; dryness of mucous membranes; very high fever, from 105° to 110° F.; rapid pulse, often irregular and intermittent; cyanosis; intensely hot skin, first moist, then dry; deep or stertorous breathing; absence of corneal and other reflexes; subsultus tendinum and convulsions; unconsciousness; contracted or irregular pupils; scanty urine; coma or sudden death. Dr. Warthin, Professor of Pathology of the University of Michigan, states the pathological findings in cases affected by the ultra-violet rays to be chiefly exudative meningitis with marked hyperemia and scattered hemorrhages through the cortex. These findings account for many of the symptoms just mentioned and particularly distinguish this disease from the effects of heat alone. These symptoms may occur while the patient is in the sun, or may not manifest themselves until many hours after exposure.

2. Sunstroke (sun-traumatism) cases, due chiefly to sun heat, but in which the actinic effect may play some part. Characterized by sudden faintness and quick recovery, or else mental and physical fatigue; thirst; headache; vertigo; confusion; photophobia; pain in the limbs; injected cornea; skin moist and cool; perhaps nausea and

vomiting; rapid, shallow respiration, never stertorous; small, compressible pulse; normal or subnormal temperature; pupils normal or dilated; no complete loss of consciousness; reflexes present; perhaps irritable bladder; more rapid recovery than in siriasis. These cases occur when the subject has been exposed to the sun, particularly while undergoing physical exertion. This condition is often a precursor to a more severe attack developing into true siriasis.

3. Heat exhaustion (heat-stroke)—effects of artificial heat alone. Characterized by symptoms quite similar to those just mentioned: headache; vertigo; moist, cool skin; shallow respirations; small pulse; subnormal temperature, being characteristic.

It will be seen that the writer has not attempted to give a complete clinical picture of these diseases in the present paper, but he hopes that what has been said will be sufficient to stimulate investigation and a more careful study of this important subject, tending toward a more accurate differential diagnosis of these classes of cases.

The author states that while serving in the tropics he had an experience which led him to discover accidentally the value of orange-yellow. He had been wearing the campaign hat according to custom, but suffered from frequent acute headache during exposure to the sun. One day he chanced to wear a khaki cap lined with orange-yellow silk, and found that the usual headache did not occur. As the result of experiment he discovered that the immunity to headaches was due to the color of the lining. Since then he has worn an orange-yellow or red lining in his headgear, and recommends its use to any patient affected by the sun's rays, always with good results, this theory having been evolved by independent experimenters, and it having been proved that the use of material which filters out the short solar rays (actinic rays) is a preventive against sunstroke, so-called. So it seems also to be proven that the actinic rays are the contributing cause to that condition. It is on the basis of these facts that the classification above given is proposed. The author quotes numbers of instances of complete immunity against the direct effects of the sun upon the part of those who had suffered repeatedly before as the result of lining their helmets and backs of their coats with orange-red.

Duncan proposes not only that all persons exposed to intense sunlight have their helmets lined with orange-red, but they should also wear an orange-red shirt, and a detachable strip of color over the spine.

Sambon advises white men in the tropics to wear black, red, or orange, as these colors exclude the short rays of the sun.

Lord Roberts stated that for the first time in his long experience he had found comfort under the Indian sun after using a combination of orange and red. In contrasting the resistance of the Filipino to that of the American, Corbusier says that the former can withstand the direct rays of the sun much better than the latter, but if the two were put in the stoke-hole of a ship the first to be overcome by heat would be the Filipino, and this would seem to show that the white man, while he can withstand a high atmospheric temperature of itself, yet not being naturally protected he is more susceptible to the actinic rays of the sun than a man of a pigmented race. By actually passing light through pigmented skin Sambon and others have shown that the ultra-violet or short waves are filtered out in direct proportion to the density of the pigmentation. It has been further shown that a given thickness of unpigmented skin allows twice as many heat rays to pass through as the black skin.

PRIMARY CARCINOMA OF THE VERMIFORM APPENDIX.

In the *American Journal of the Medical Sciences* for June, 1908, McWilliams reports three instances of this condition and has collected 87 cases from literature. The conclusion of his study would seem to be that primary cancer of the appendix may be expected in about 0.4 per cent of cases; that the affection is most frequently observed before the thirtieth year; that enlarged

glands are exceptional; that in the majority of cases the tumor is situated near the tip of the organ, and that in certainly 50 per cent of cases no visible tumor can be seen on inspecting the appendix from the outside, whilst in one-third of the cases tumor could not be seen with the naked eye even after the appendix had been opened. Enlarged lymphatic glands are regarded as being present in 8 or 9 per cent, and microscopic examination of such glands demonstated that they were not necessarily cancerous, from which it is argued that probably cancer of the appendix involves the lymphatics very slowly. In 79 cases the patients were operated on, and the duration of the cure is given in 30 instances. Seven patients were well five years or more after the original operation; 13 were in good health three years or more afterward; 21 showed no sign of any recurrence two years or more after operation. In only one instance of the 79 cases is it definitely stated that the growth recurred. The symptoms are not sufficiently characteristic to make a diagnosis possible without operation, but any circumscribed tumor in the appendix should always arouse the suspicion of cancer and should suggest a wide excision of the mesoappendix, together with the removal of enlarged glands.

PRIMARY TUMORS OF THE ADRENAL GLAND IN CHILDREN.

Tileston and Wolbach (*American Journal of the Medical Sciences,* June, 1908) report the case of an infant aged sixteen months, admitted to the hospital because of orbital tumor, in which the postmortem examination ultimately showed a primary sarcoma of the suprarenal gland. In commenting upon this case the authors divide tumors of the adrenal gland in children into four classes: (1) Those with metastases to the skull (Hutchison's type); (2) those of simultaneous sarcoma of the liver and adrenal; (3) those associated with precocious maturity; and (4) those not falling under any of the preceding headings.

The Hutchison's type, of which fourteen cases have been reported, occurs only in infants or young children, is characterized by spontaneous or post-traumatic ecchymosis of one or both eyelids, followed by an exophthalmos which is usually unilateral, which in turn is succeeded by a growth in the adjacent temporal region, with enlargement of the lymph nodes. Tumor in the renal region is usually not felt. The tumor grows with great rapidity, and death occurs from anemia and cachexia. Even if the abdominal tumor is large and palpable it does not cause ascites, but presents a secondary anemia which may become extreme. Twelve of the fourteen reported cases were not over three years of age, and four were under one year. The eldest case reported was nine years; the male sex predominated. The adrenal growth is usually unilateral, hemorrhagic, and exhibits little tendency to infiltrate the surrounding tissue. Skull metastasis was present in all cases, was in the ribs in four cases, was in the spine and tibia each in one case.

The favorite seat of metastasis next to the ribs is the costochondral juncture, the resulting picture being much like that of rickets. While the skull growth may be very large, the brain is not involved, excepting by pressure. The growth is nearly always sarcoma.

The second type of adrenal tumor in children is characterized by simultaneous round-celled sarcoma of the liver and adrenals. It is encountered as a congenital tumor in the first week of life and forms an enormous growth without ascites, and as a rule without jaundice. It forms a diffuse infiltration.

The third type chiefly affects girls of twelve to fourteen years. It runs its course in years. The face and pubes become covered with a growth of hair, and the external genitals are as fully developed as in the adult. These children are large, fat, brown, but not distinctly pigmented, dull in intellect and sullen in disposition. The tumors causing this group of symptoms are likely to be hypernephromas rather than sarcomas. Precocious maturity, or giant growth, alone or combined, have been found also in tumors

of the pituitary and pineal glands, of the testes and ovaries; and retardation of growth has been associated with lack of development of the thyroid (cretinism) and of the adrenal glands.

In the diagnosis of this condition the author states that tumor of the orbit in infants and young children should arouse the suspicion of metastases from an adrenal growth. If an abdominal tumor be found it is almost certainly of adrenal origin, and this would be still further corroborated by enlargement of the preauricular glands, which renders the diagnosis of sarcoma of the orbit unlikely. Chloroma presents almost identical growths, being associated with tumors of the orbit in two-thirds of the cases, with exophthalmos usually as the first symptom, but this may be excluded in the absence of leukemic changes in the blood. Myeloma may cause bony growths about the skull, but is exceedingly rare in childhood; the presence of the Bence-Jones body in the urine would render the diagnosis of myeloma certain, while its absence is not conclusive. The authors state that abdominal tumor associated with precocious maturity is practically certain to be of adrenal origin, if tumors of the ovaries or a retained testis can be excluded. Other adrenal tumors cannot be distinguished from tumors of the adjacent tissues, especially of the kidney.

Concerning treatment, the only hope lies in early radical removal, nor does this seem a promising procedure, since these tumors usually pass unnoticed until either their great size or the presence of metastases attracts attention, and then it is too late as a rule for successful operation.

COMPRESSION OF THE PELVIS IN OPERATION FOR EXSTROPHY OF THE BLADDER.

WILMS (*Deutsche Zeitschrift für Chirurgie*, Bd. xciii, Heft 3) describes an apparatus which he has invented for compression of the pelvis in carrying out the Trendelenburg operation for exstrophy of the bladder. By means of this the large pressure sores caused by the compression by means of a band are avoided. The apparatus consists of a large curved iron, in each end of which is a set-screw which carries on its inner end a block of wood, upon each of which are mounted three nails which point toward similar nails in the opposite block. The movement of the screws causes the nail points in one block to approach those in the other. The whole apparatus is essentially a large clamp. Each of the nails has about one centimeter from its tip a collar to determine the depth to which it shall penetrate. The ilium is chiseled away from the sacrum on each side, and after waiting eight days for the wounds to heal the apparatus is sterilized and an incision made in the skin on each side just behind the spines of the ilium for the reception of the nail points. The edges of the bladder are then freshened and the deep sutures put in but not tied; the nails of the clamp are then set and the screws tightened so as to compress the pelvis in such a way as to bring the edges of the bladder together when the stitches are tied. The other stitches can be put in at leisure. The clamp is kept in place four or five weeks. It causes no pain and gives good results. The patient can easily be kept clean while it is in place.

TREATMENT OF GONORRHEAL ARTHRITIS OF THE LARGE JOINTS BY MEANS OF PASSIVE HYPEREMIA.

BAETZNER (*Deutsche Zeitschrift für Chirurgie*) reports from Bier's clinic 40 cases of gonorrhea of the large joints treated by Bier's hyperemia method. Of these 19 were of the wrist, 10 of the elbow, 7 of the shoulder, and one of the knee and ankle. Thirteen of these were treated early in the course of the disease, and all were cured without diminution of function of the joint. Twenty-seven cases were presented for treatment from ten days to twenty-one weeks after the onset. Of these 12 were completely cured; 9 showed some diminution in the function of the joint, while the remaining 6 have joints of about half their normal functional power.

The technique of the treatment is impor-

tant. In the involvement of the wrist and elbow there is placed on the arm a thin, transparent rubber band about 2½ inches broad, so that its turns almost cover the joint. When the ankle or knee is involved the band is put upon the thigh. In case of the shoulder-joint a piece of soft-rubber tube, sheathed with felt to avoid the bad effects of pressure, is applied around the shoulder so firmly that marked venous congestion of the arm occurs; then it is fastened with a clamp or by tying. It is held in place by a bandage passing under the opposite arm. The constriction should always be of such grade that the extremity shows a fiery-red edema, and at the same time an easily palpable pulse. Pain and blue color in the part must always be avoided. This hyperemia is continued twenty to twenty-two hours. The subsequent treatment consists of passive motion and massage.

By means of this method of treatment the author has found that the pain has diminished from the beginning of the treatment and has very soon disappeared entirely; the clinical course of the disease is milder and is very much shortened, and the functional results are better than by other methods. The joint can be mobilized earlier, and ankylosis has not occurred in any of his cases. The method is simple, easy to apply, and its cheapness puts it within the reach of all. It constitutes a very important advance in the treatment of gonorrheal arthritis.

THE CUTANEOUS DIAGNOSIS OF SURGICAL TUBERCULOSIS.

MALIS (*Deutsche Zeitschrift für Chirurgie,* Bd. xciii, Heft 3) reports in detail 105 cases in which he has used the skin-inoculation test for suspected surgical tuberculosis, and concludes as follows:

The skin-reaction method for diagnosis of tuberculosis is absolutely without danger. The action is purely local. There are no contraindications to its use. It is the only method of diagnosis which can be used freely on man for experimental purposes. In every patient in whom tuberculosis is present, except very advanced cases, a positive reaction is obtained. This is true even of the inactive forms of the disease. A negative result is obtained only in cases in which no tuberculosis is present and in very advanced cases such as are easy to differentiate. The strength of the reaction gradually diminishes as the disease progresses, until finally it entirely disappears. This affords a means of studying the progress of the disease.

In surgical tuberculosis the reaction is generally much more marked than in the pulmonary form.

THE INFLUENCE OF PURE OXYGEN UPON WOUNDS AND INFECTIONS.

BURKHARDT (*Deutsche Zeitschrift für Chirurgie,* Bd. xciii, Heft 2) reports his investigations upon the influence of pure oxygen upon wounds and wound infections, and concludes as follows:

Contact with pure oxygen causes a marked arterial hyperemia in the wound, the surface remains moister, and the formation of granulations is promoted. While in artificial culture media the growth of facultative aerobic bacteria is much retarded by oxygen, in the animal body their growth is but little hindered, although their toxic power is slightly reduced. When oxygen is brought into contact with the peritoneum there is produced a mild inflammation and hyperleucocytosis, and in this way absorption is retarded. Ozone exerts a more powerful influence than oxygen, especially in the body cavities.

Correspondence.

THE TREATMENT OF PERTUSSIS BY MEANS OF THE ABDOMINAL BINDER.

To the Editor of the THERAPEUTIC GAZETTE.

SIR: Owing to a typographical error in the September issue of the THERAPEUTIC GAZETTE, Dr. Kilmer's name was spelled "Kehun." Will you please see that the correction is made, as I wish to give credit to Dr. Kilmer? Yours truly,

PAUL B. CASSIDY.